Service Manual

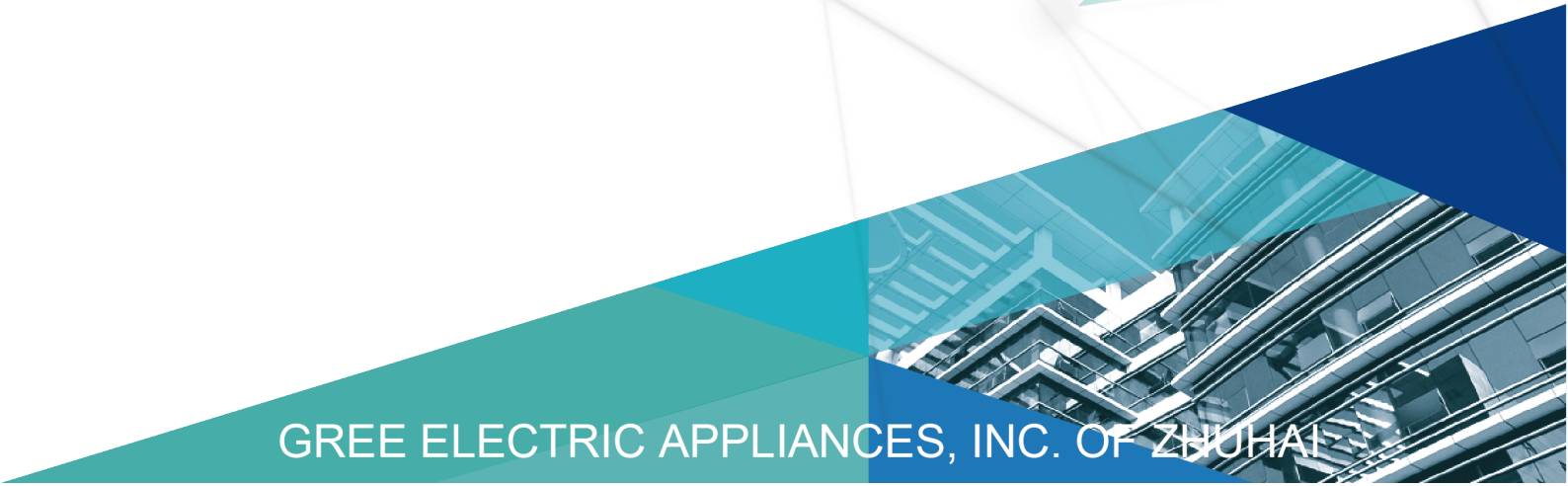
DC INVERTER VRF SYSTEM (R32)

(GC202603-I)

Capacity: 8~15.5

Rate Frequency: 50Hz/60Hz

Operation Range: -5~55°C



GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI

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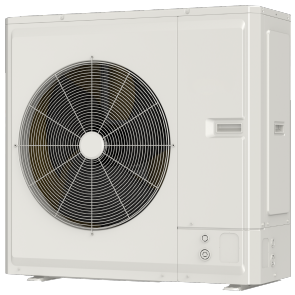
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PRODUCT

PRODUCT

1 Product List

Model	Product Code	Cooling Capacity (kW)	Heating Capacity (kW)	Power Supply	Refrigerant	Appearance
GMV-S80WL/NhD-S	CN853W0190	8	8	220-240V 50/60Hz	R32	
GMV-S100WL/NhD-S	CN853W0200	10	10			
GMV-S121WL/NhD-S	CN853W0180	12.1	12.1			
GMV-S141WL/NhD-S	CN853W0170	14.1	14.1			
GMV-S160WL/NhD-S	CN853W0160	15.5	15.5			

2 Nomenclature

GMV	□	□	—	□	□	□	W	□	/	□	□	□	(□)
1	2	3		4	5	6	7	8		9	10	11	12

2.1 Nomenclature of Outdoor Units

No.	Description	Options
1	Product code	GMV—Gree Multi VRF Units
2	Suitable climate	Omit—T1 condition T2—low temperature climate T3—high temperature climate
3	Function type	Omit—Heat pump L—Cooling only
4	RAC or CAC	Omit—CAC H—RAC
5	Function code	Omit—no special function V—low ambient temperature heat pump unit
6	Code of cooling capacity	Nominal capacity/100(W)
7	Code for outdoor unit	W—outdoor unit
8	Unit structure	Omit—Non-modular (top discharge) M—Modular (top discharge) L—Non-modular (side discharge)
9	Refrigerant	Nh—R32
10	Design No.	Named in order of A, B, C, or combined with 1, 2, 3…
11	Power supply	7000~18000W, Omit—1 phase; S—3 phase
12	Area code	Omit—for general area For special area, area code is in the form of one capital letter: A, P or S…

3 Product Features

3.1 General Introduction

These products are the latest generation of DC inverter units. One set of air-cooled outdoor unit can be connected with multiple direct evaporation indoor units that are of the same or different forms and capacity. This refrigerating system can directly provide air conditioning for one or more areas, and is applicable for residential and light commercial uses. It features high energy efficiency, strong anti-interference capability, long connectable pipe, wide operation range, good sound quality, intelligent capacity regulation, complete protection, etc.

3.2 Features

(1) Super high energy efficiency

The latest generation of DC Inverter Multi VRF System adopts DC motor to realize complete direct current and upgrade the energy efficiency.

(2) New generation CAN bus communication

Due to the latest communication method—CAN Bus Communication, system's anti-interference capability is stronger and the control on indoor units is more accurate, with higher reliability. Specialized shield wire is no more needed and ordinary communication wire can be applied in the construction, which has increased the installation flexibility.

(3) Long connection pipe

The maximum length of connection pipe is 120m (in total) and the farthest connection pipe between indoor and outdoor units can be 60m's long, which has extended the installation condition and reduced the limit of installation distance.

(4) Wide operation range

Units can operate reliably in a wide temperature range (cooling: -5~55°C, heating: -20~27°C).

(5) Fine sound quality

Through a series of optimized measures, system has reduced the throttle noise and oil return noise of indoor units, gas bypass noise, etc. so that units are more comfortable regarding sound quality.

(6) Intelligent PID capacity regulation

With the independently developed PID capacity regulation technology, units are able to control the indoor ambient temperature more quickly and reduce the fluctuation of room temperature.

(7) Complete protection

Units are equipped with a series of protection to accurately identify errors and protect the units, which has ensured reliable and safe operation.

4 Specifications

4.1 Specifications

Model			GMV-S80 WL/NhD-S	GMV-S100 WL/NhD-S	GMV-S121 WL/NhD-S	GMV-S141 WL/NhD-S	GMV-S160 WL/NhD-S
Cooling capacity	Rated	kW	8	10	12.1	14.1	15.5
Heating capacity	Rated	kW	8	10	12.1	14.1	15.5
SEER	Ducted	—	7.31	7.11	7.76	7.72	7.53
	Cassette	—	7.28	7.65	7.96	7.95	7.70
SCOP	Ducted	—	4.81	5.00	5.02	5.14	4.86
	Cassette	—	4.53	4.82	4.98	4.89	4.7
Sound power level	Ducted	dB(A)	70	70	74	75	75
Circulating air volume		m^3/h	4500	4500	5000	5600	6100
Refrigerant charge volume		kg	2.4	2.4	2.4	2.4	2.4
Power supply			220-240V ~ 50/60Hz				
Unit dimensions (mm) (W×D×H)			990×370×955				
Package dimensions (mm) (W×D×H)			1068×468×1110				
Compressor			QXFS-B360zX050				
Water-proof level			IPX4	IPX4	IPX4	IPX4	IPX4
Suitable climite			T1	T1	T1	T1	T1
Connection pipe	Gas	mm	Φ15.9	Φ15.9	Φ15.9	Φ15.9	Φ15.9
	Liquid	mm	Φ9.52	Φ9.52	Φ9.52	Φ9.52	Φ9.52
	High pressure gas	mm	Φ12.7	Φ12.7	Φ12.7	Φ12.7	Φ12.7
	Connection method		Flare	Flare	Flare	Flare	Flare
Net weight		kg	82.5	82.5	82.5	82.5	82.5

NOTES:

① Units conform to design standard: EN 14511.

② Specifications may be changed due to product improvement. Please refer to nameplates of the units.

③ Noise data are collected from a semi-anechoic room. Decibels may be slightly higher in actual operation due to environmental change.

④ Refrigerant charge volume listed in the table is based on the condition where indoor and outdoor units are at a same level and with no connection pipe. Supplementary refrigerant needs to be charged according to actual circumstance.

⑤ The sectional area of conducting wire is only applicable when the length is within 15m. If it's over 15m's long, sectional area must be increased accordingly, otherwise, over-current may burn the wires.

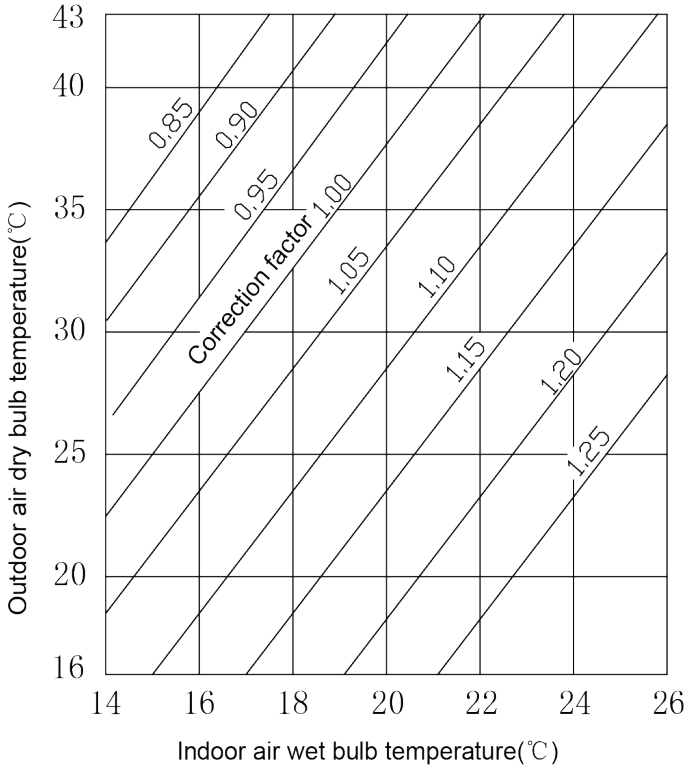
4.2 Operation Range

Cooling	Outdoor temperature: -5~55°C
Heating	Outdoor temperature: -20~27°C

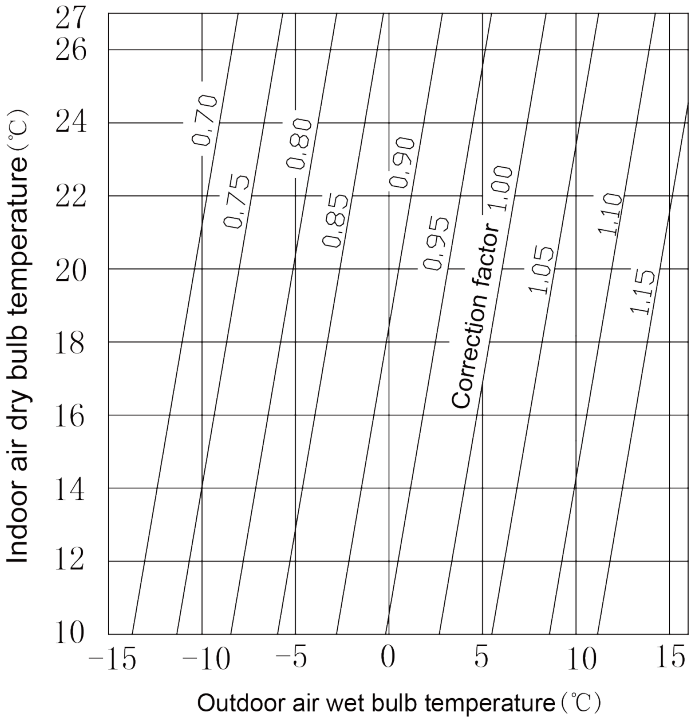
5 Product Capacity Correction

5.1 Correction Factor of Indoor and Outdoor Temperature

(1) Correction factor of cooling capacity



(2) Correction factor of heating capacity



5.2 Correction Factor of Pipe Length and Height Difference

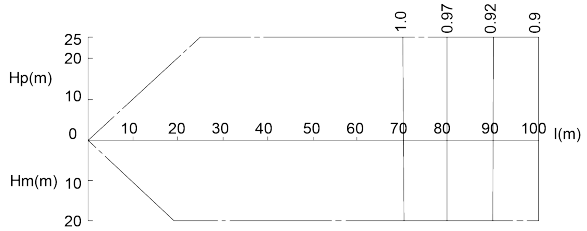
Symbol description:

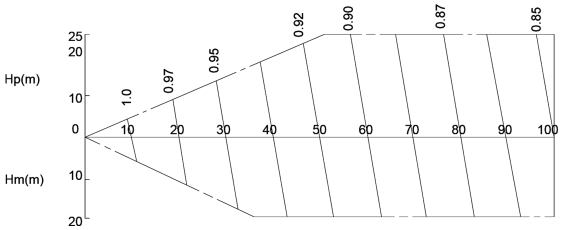
Hp: Height difference in case indoor unit is below outdoor unit (m).

Hm: Height difference in case indoor unit is above outdoor unit (m).

L: Length of one-way equivalent pipe

Below table shows the capacity variance ratio for 100% full load in standard working condition (thermostat setting is 16°C for cooling and 30°C for heating).

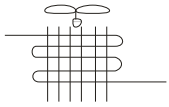




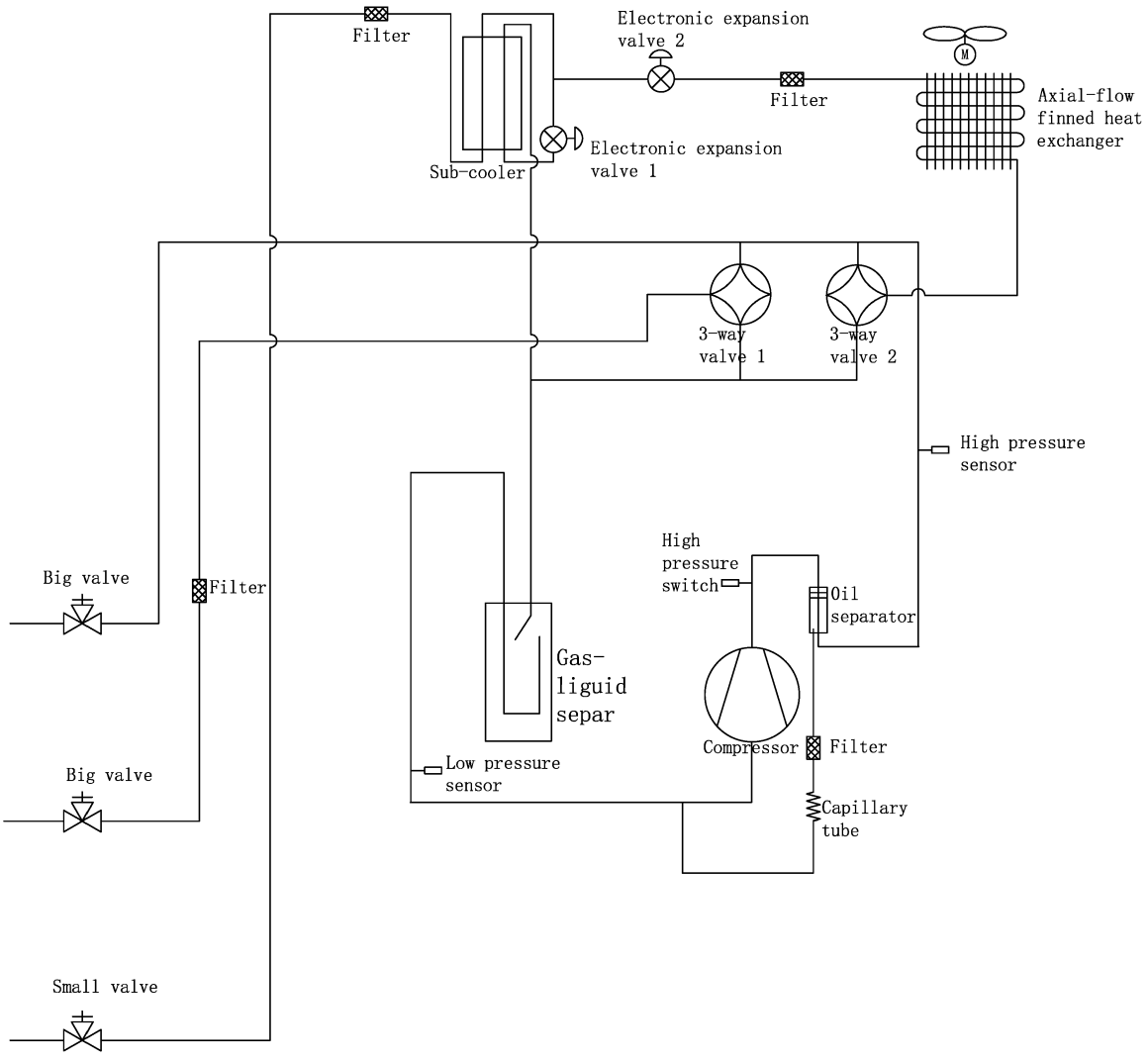
GMV-S80WL/NhD-S,GMV-S100WL/NhD-S,GMV-S121WL/NhD-S,GMV-S141WL/NhD-S, GMV-S160WL/NhD-S

6 Principal of Operation

Components in flowcharts are presented according to the following table:

Name	Compressor	4-way valve	Cut-off valve	One-way valve	Capillary tube
Symbol					
Name	Gas-liquid separator	Pressure switch	Pressure sensor	Axial-flow finned heat exchanger	Electronic expansion valve
Symbol					

GMV-S80WL/NhD-S,GMV-S100WL/NhD-S,GMV-S121WL/NhD-S,GMV-S141WL/NhD-S, GMV-S160WL/NhD-S



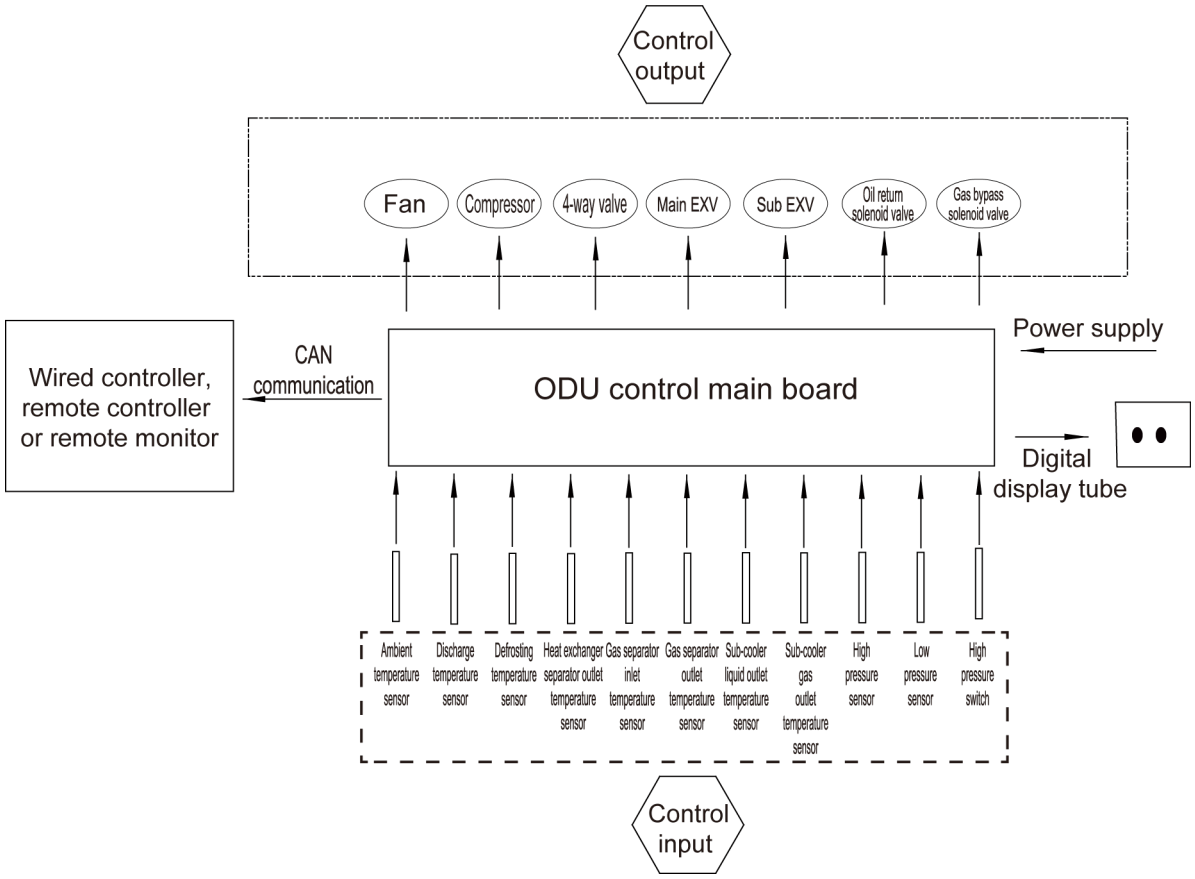
In cooling, the low-temperature and low-pressure refrigerant gas from each indoor heat exchanger will be merged and inhaled by the compressor and then become high-temperature and high-pressure gas, which will later be discharged into outdoor heat exchangers. By exchanging heat with outdoor air, refrigerant will turn to liquid and flow to each indoor unit via Y-type branch or manifold. Pressure and temperature of the refrigerant will then be lowered by throttle elements before it flows into indoor heat exchangers. After exchanging heat with indoor air, refrigerant wil become low-temperature and low-pressure gas again and repeat the circulation so as to realize the cooling effect. In heating, 3-way valve will be energized to make refrigerant circulate in a reverse direction of cooling. Refrigerant will release heat in indoor heat exchangers (electric heating elements will also work under certain circumstance and release heat) and absorb heat in outdoor heat exchangers circularly so as to realize the heating effect.

CONTROL

CONTROL

1 Units' Control

1.1 Schematic Diagram of Units' Control



1.2 Interpretation on The Schematic Diagram

(1) High pressure switch is used to identify system's high and low pressure. When pressure is too high, the switch will break off and send a signal to main board. Main board will pass this signal to controller, where the error will be displayed, and stop unit from working.

(2) High/low pressure sensor is used to test unit's high/low pressure and send real-time data to controller, which will control each unit's output according to the control logic.

(3) Temperature sensors are used to test the tube temperature of the unit and send data to the controller, which will control each unit's output according to the control logic.

2 Remote Monitoring System

2.1 General Introduction

Gree CAC Remote Monitoring System is an automatic central management system as well as an intelligent power management system based on internet or local area network. It can provide a complete set of air conditioning solutions, including remote monitor, malfunction alarms and visual management, for the real-time, safe and efficient management of air conditioners.

Gree CAC Remote Monitoring System can save your cost on human resources and equipment management. User can check the running status of air conditioners, turn units on or off, set temperature

or other functions just by means of a browser (e.g. IE, Firefox, Chrome) in every corner of the world.

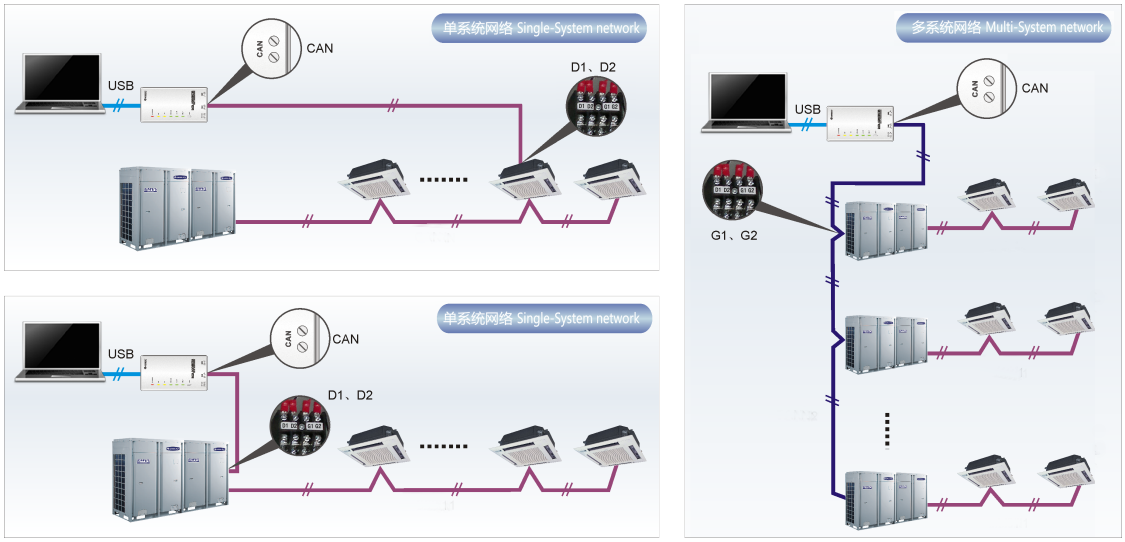
3 Monitoring Software

3.1 Function Introduction

With the rapid development of building complex, more and more central air conditioners in various models are used in different places, resulting in inconvenience for the management of air conditioners. Integrating with telecommunication technology and computing software, Gree Commissioning Tool Kits can realize the comprehensive monitor, control and commissioning on central air conditioners. It is an efficient solution for the management of central air conditioners that are separated in different parts of a building. Administrator doesn't need to control every unit on site, but rather controls the units by just sitting in front of a computer. This will not only improve the productivity, but also reduce cost on human resources, property and management.

Gree Commissioning Tool Kits can monitor and control the 2nd generation of Gree Multi VRF. User can monitor and control units by monitoring the computer. This software is an efficient tool for the intelligent air conditioning management as well as installation and after-sales service and commissioning. It can debug units and control units' operation status quickly and conveniently. It will not only improve the productivity but also reduce the difficulty and cost of commissioning and maintenance, providing better and faster service to customers.

3.2 Connection of Computer and Units



It can be connected with single-system network or multi-system network. In the single-system network, indoor units or outdoor units are connectable, while in the multi-system network, only the master outdoor unit can be connected.

Seen from the diagram, Gree commissioing network is made up of 3 parts:

The 1st part is the monitoring computer, including Gree debugger and Gree USB converter driver that are installed in the computer.

The 2nd part is Gree USB converter, which is to convert the air conditioning communication into computing communication. This part is made up of Gree USB data converter and USB data wire.

The 3rd part is air conditioners, including outdoor units, indoor units and the connection wires. If

connection wire is not long enough, it's OK to connect via the patching board of the commissioning tool kits. In a single-system network, both indoor units and outdoor units can be connected, while in a multi-system network, only the master outdoor unit can be connected.

3.3 Parts Introduction

3.3.1 List of Parts

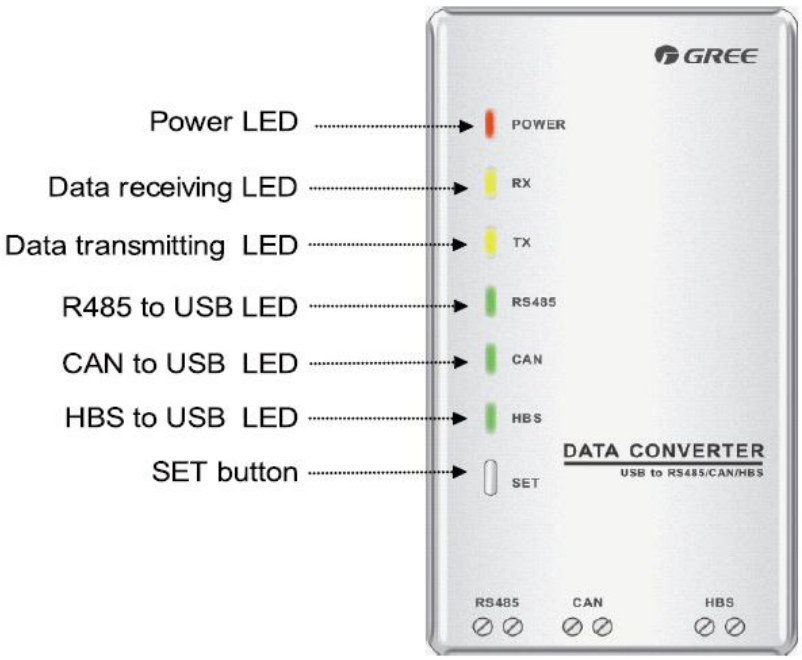
Name	Model	Material no.	Remark
Gree USB data converter	MC40-00/B	30118027	Convert the air conditioning communication into computing communication.
Gree Commissioning Tool Kits (CD-ROM)	DG40-33/A(C)	36400000003	Include Gree debugger, monitoring software, USB driver and USB converter configuring software.
USB wire	\	40020082	Wire connecting computer's USB interface and converter.
Communicaiton board	\	30118015	This board can be used when units are far from the computer.
Board connection wire (1m)	\	4001023229	4-core wire connecting units and converter.
Board connection wire (5.5m)	\	4001023214	4-core wire connecting units and converter.
Instruction manual	\	66174100018	Instruction manual.

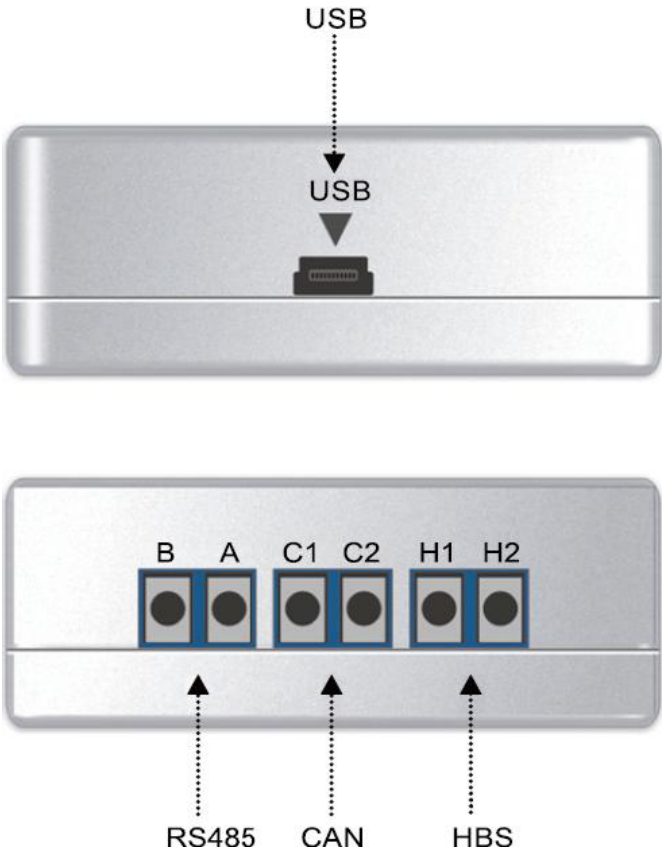
3.3.2 Gree USB Data Converter

3.3.2.1 Functions Introduction

Gree USB data converter will convert the RS485, HBS and CAN commucation within the air conditioners into the communication that is recognizable by computer's USB interface.

3.3.2.2 Appearance





3.3.2.3 Operation Instruction

(1) Power LED: a red light. If the red light is on, it indicates normal power supply. If the red light is off, it indicates the power supply of converter is not normal.

(2) Communication LEDs: yellow lights. When converter is working and the computer is transmitting data, the TX data transmitting light will be flickering. When units are uploading data to the computer, the RX data receiving light will be flickering.

(3) When converter is under RS485 data transferring mode, the function LED of RS485 to USB will be on.

(4) When converter is under CAN data transferring mode, the function LED of CAN to USB will be on.

(5) When converter is under HBS data transferring mode, the function LED of HBS to USB will be on.

(6) USB interface: connect USB data wire.

(7) CAN interface: When converter is under CAN communication mode, connect air conditioner's CAN data interface. CAN interface exhibits no polarity (A and B are equal).

(8) HBS interface: When HBS converter is under HBS communication mode, connect air conditioner's HBS data interface. HBS interface exhibits no polarity (This interface is not yet available for Gree debugger and the monitoring software).

(9) RS485 interface: When RS485 converter is under RS485 communication mode, connect air conditioner's RS485 data interface. RS485 interface exhibits polarity and terminal A and B are different.

3.3.2.4 Installation Notice

(1) Install indoors. To avoid collision, it is suggested to place it in the monitoring room together with the computer.

(2) No need of power supply. Power is supplied through computer's USB interface.

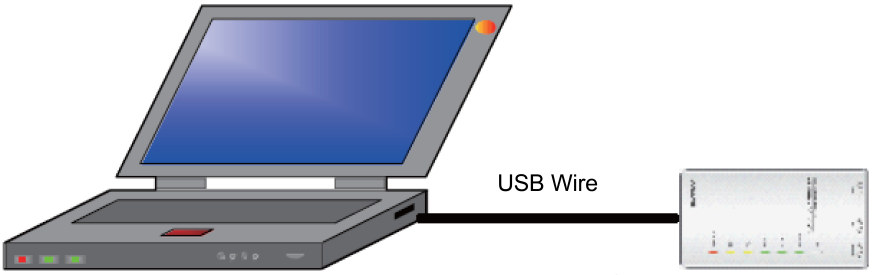
3.3.3 Communication Board

Communication board is mainly used for transferring data. It functions similar with a patching board. Provided that units are far away from the monitoring computer, communication board can be used for connection.

3.3.4 Communication Cord

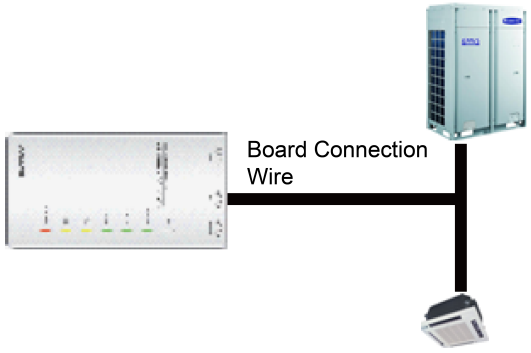
3.3.4.1 USB Wire

Connect USB wire with computer's USB interface at one end and with the USB interface of USB data converter at the other end, as indicated below:



3.3.4.2 Board Connection Wire

There are 2 board connection wires supplied for the commissioning tool kits. One is 1 meter's long and the other is 5.5 meters' long. They are only different in length. One end of the wire shall connect with air conditioner's communication interface and the other end shall connect with CAN interface of Gree USB converter. As shown below, the wire can be connected to the communication interface of outdoor unit or the communication interface of indoor unit:



3.4 Software Introduction

(1) One-button commissioning

Personnel responsible for the commissioning of air conditioners can start commissioning by pressing one button according to the commissioning logic of software, which will give the commissioning order to units. Then commissioning will be started up automatically step by step. During the commissioning, the corresponding process will be ticked in green on the software interface. If any commissioning process is not normal, it will be displayed in red.

(2) Comprehensive monitoring

The software can monitor every part of the air conditioning system, including functions, equipment and components operating status. The monitoring results will be displayed in text or curve so that user can acquire the operating status of the entire system conveniently and straightforwardly.

(3) Real-time control

Air conditioner's operating time and requirements may be different based on areas and functions. User can set units' parameters on computer according to actual needs, such as the on/off, temperature, fan speed, mode, etc. Meanwhile, the software can also set or view the function parameters of outdoor units, gateway and other equipment. In this way, the mangement of central air conditioners is realized.

(4) Replay history

Software can replay and save the historical monitoring information in the data base. The replay speed can be selected and the information will be shown in text or curve. This function has greatly saved the time to track problem cause and resolved the difficulty of problem reproduction.

(5) Applicable to multiple series, models and users

Gree Commissioning Tool Kits is applicable to air conditioning system that comsists of multiple series and models. Later, it will be developed to cover all series of Gree central air conditioners, such as multi VRF, centrifugal chiller, screw type chiller, ground source heat pump units, modular units, fan coiled units, close control units, etc. It can be used by system and controller designers to develop and monitor units, or used for maintenance and commissioning.

(6) Other functions

For the convenience of users, the software has added functions like connection guide, printing screen, opening database folder, rebuilding database, changing database saving path, etc.

3.4.1 Software Installation

3.4.1.1 Installation Requirements

(1) Computer Configuration

Memory	1 GB at least 2 GB or above is preferred
Hard Disc	10 GB available
CPU	Core 2 or higher 1 GHz at least 2 GHz or above is preferred
Operation System	Windows Server 2003 SP3 or higher Windows XP SP3 or higher Windows Vista Windows 7

(2) CD Playing

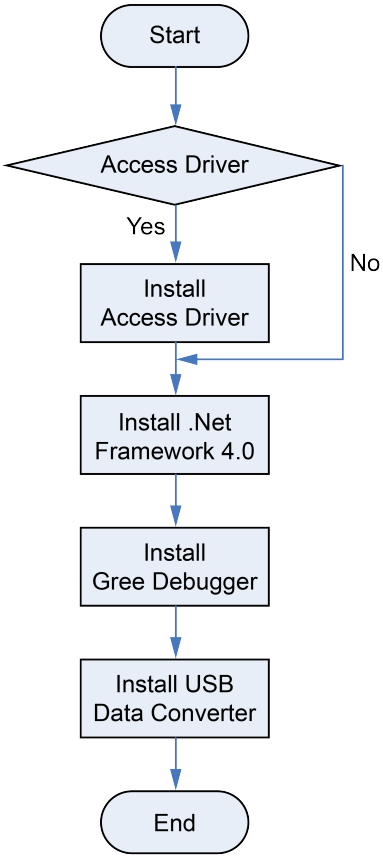
Make sure you have administrator access to the computer and there is a CD-ROM in the computer. Put the CD into the CD-ROM. If it's automically running, then the following display will be shown. Or double-click the file "Launcher.exe".



For the first time to use Gree Commissioning Tool Kits, install these programmes: .Net Framework 4.0, USB Data Converter, Access Driver (necessary for versions below OFFICE 2007), Gree Debugger.

3.4.1.2 Installation Flowchart

Button Graphics



This flowchart describes basically the software installation process. See below for details.

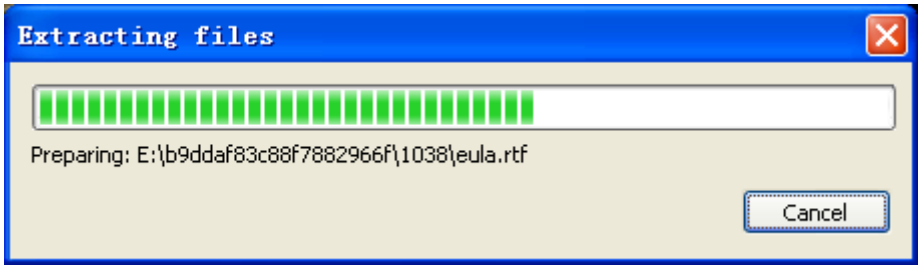
3.4.1.3 Installation Process

(1) Install .Net Framework 4.0

1) If your computer has installed .Net Framework 4.0 or versions above, there's no need to install again. Otherwise, click "Install .Net Framework 4.0".

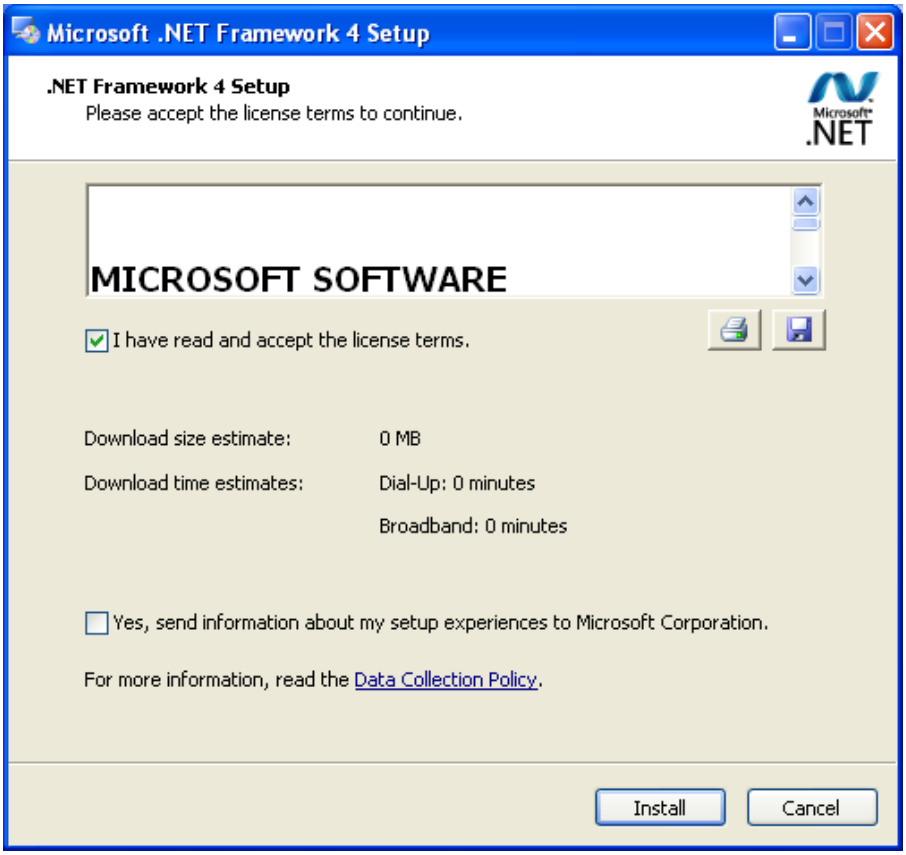


2) Extracting files

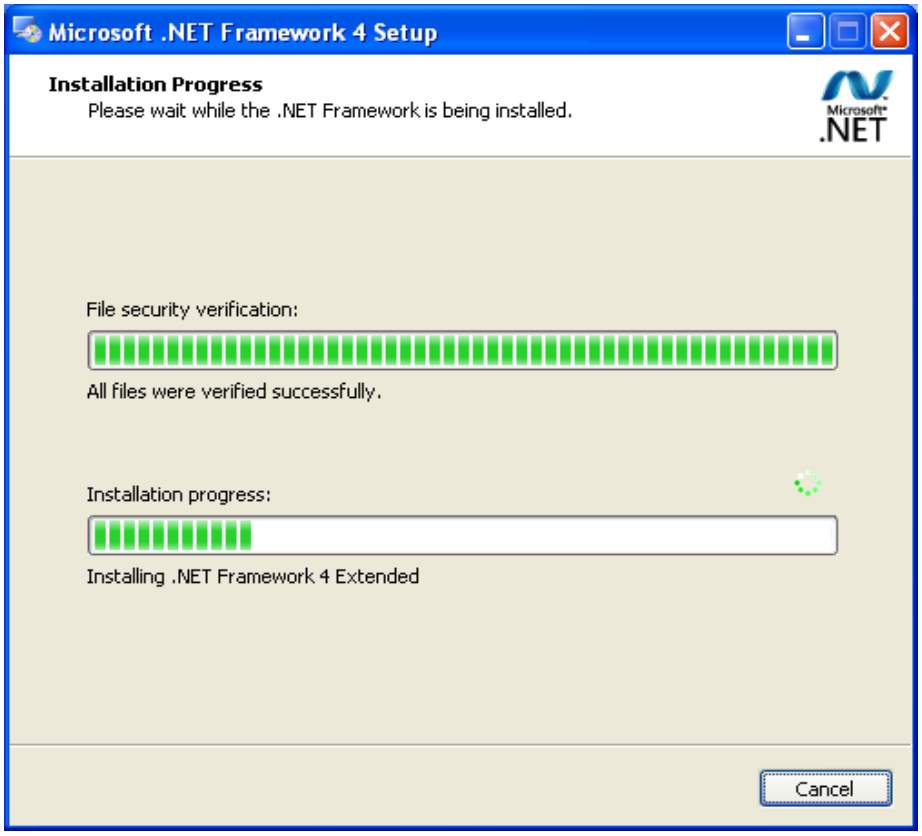




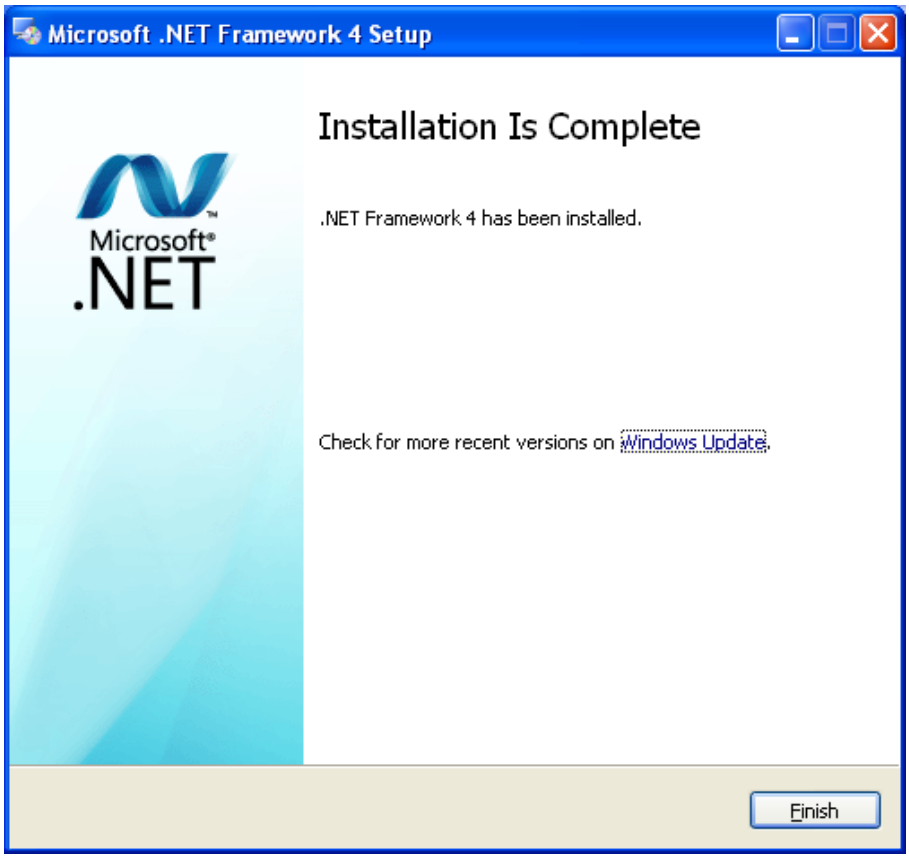
3) Click and select “I have read and accept the license terms”. Then click “Install”.



4) Installation is in progress.



5) Click “Finish” to complete the installation.

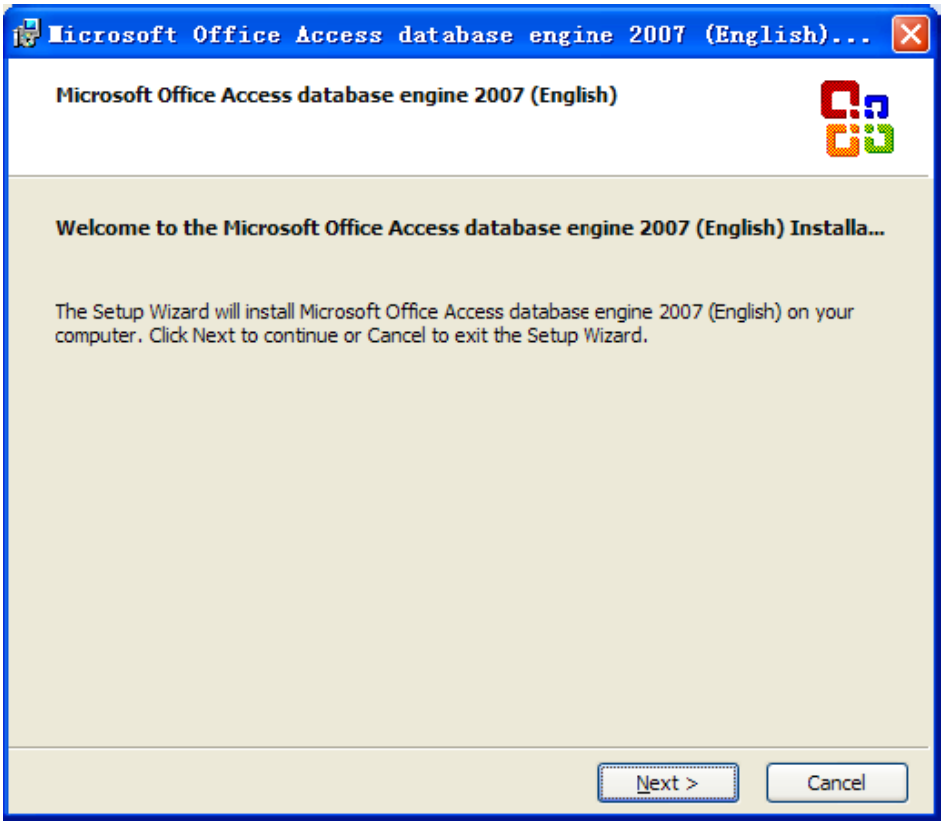


(2) Install Access Driver

1) Before operating Gree commissioning software, please first install Access Driver (necessary for versions below OFFICE 2007). Click “Install Access Driver”.



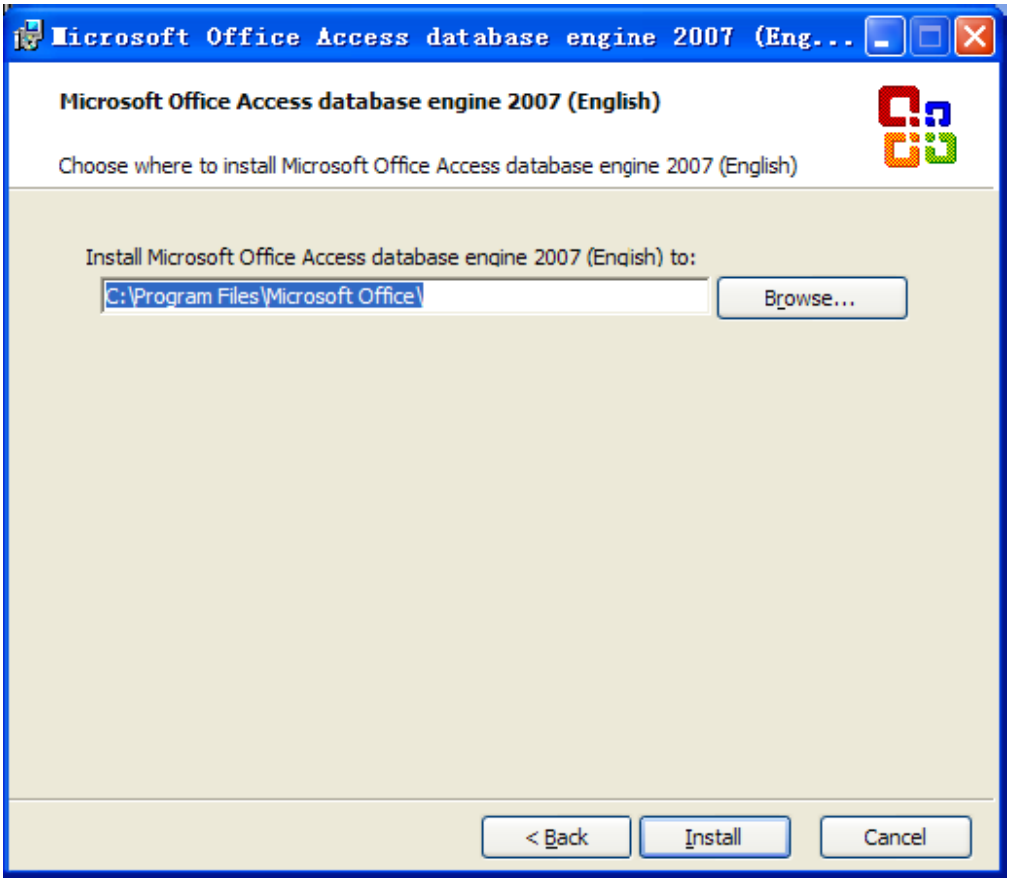
2) Click “Next”.



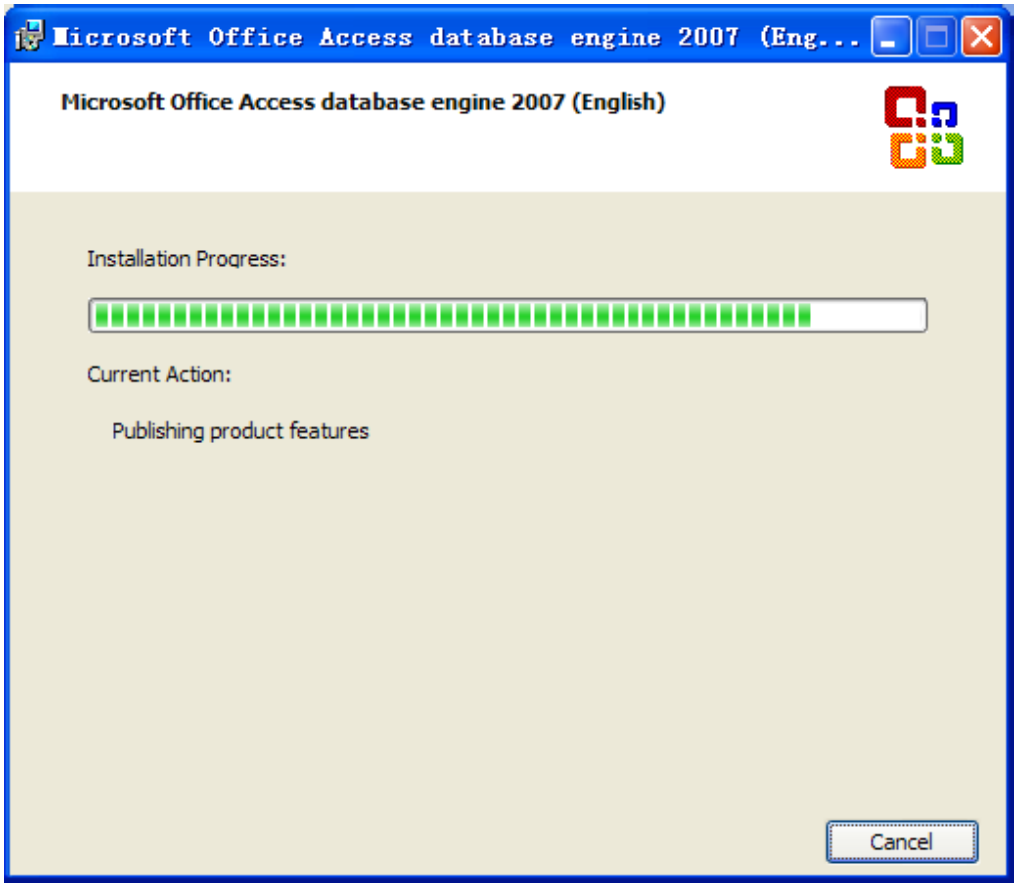
3) Tick “I accept the terms in the License Agreement” and then click “Next”.



4) Click “Browse” to change the default folder to the expected one, or click “Install” to continue the installation.



5) Installation is in progress.



6) Click “Ok” to complete the installation.

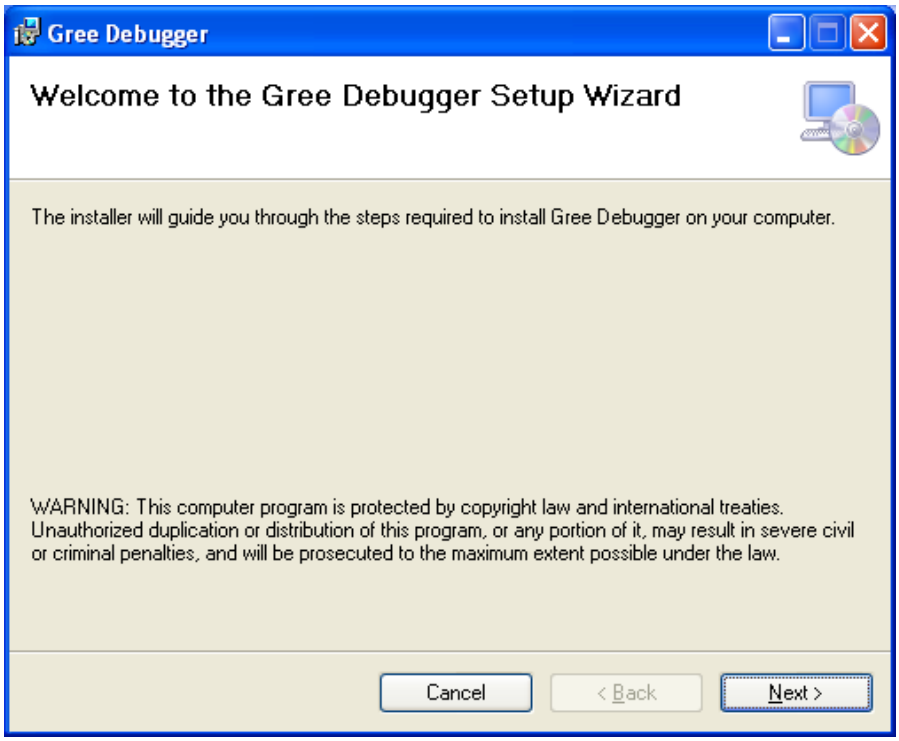


(3) Install Gree Debugger

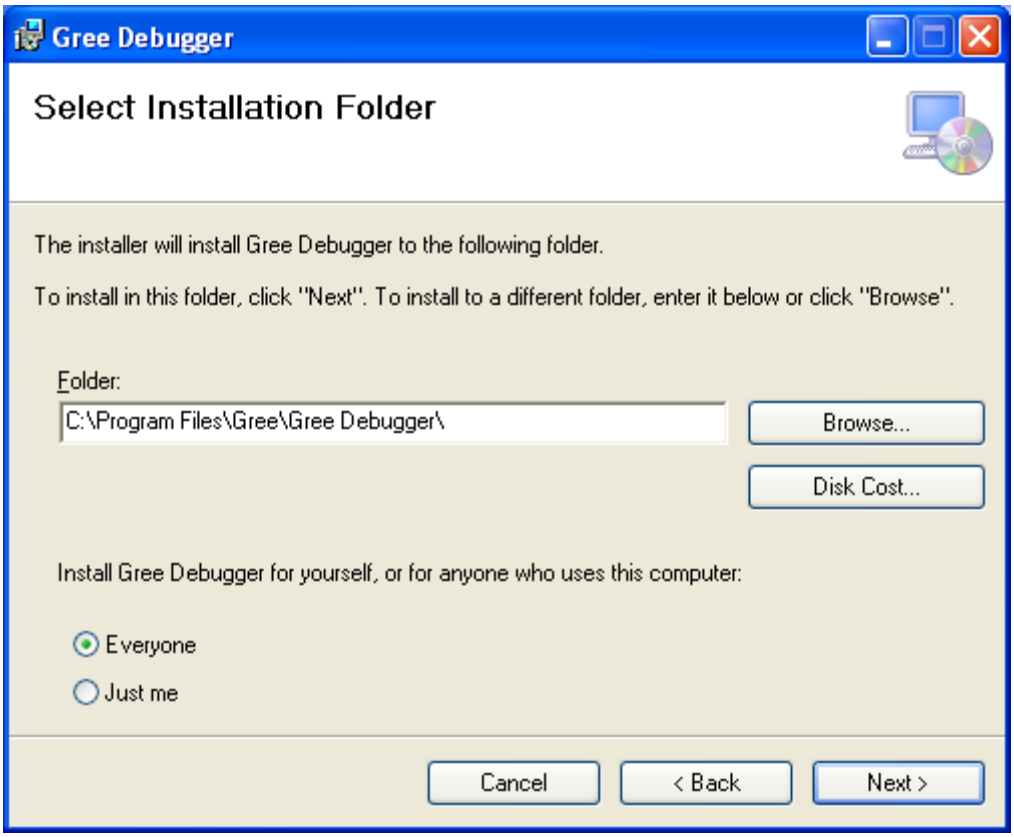
1) Before installing Gree debugger, make sure that your computer is installed with .Net Framework 4.0 or versions above. Then click “Install Gree Debugger”.



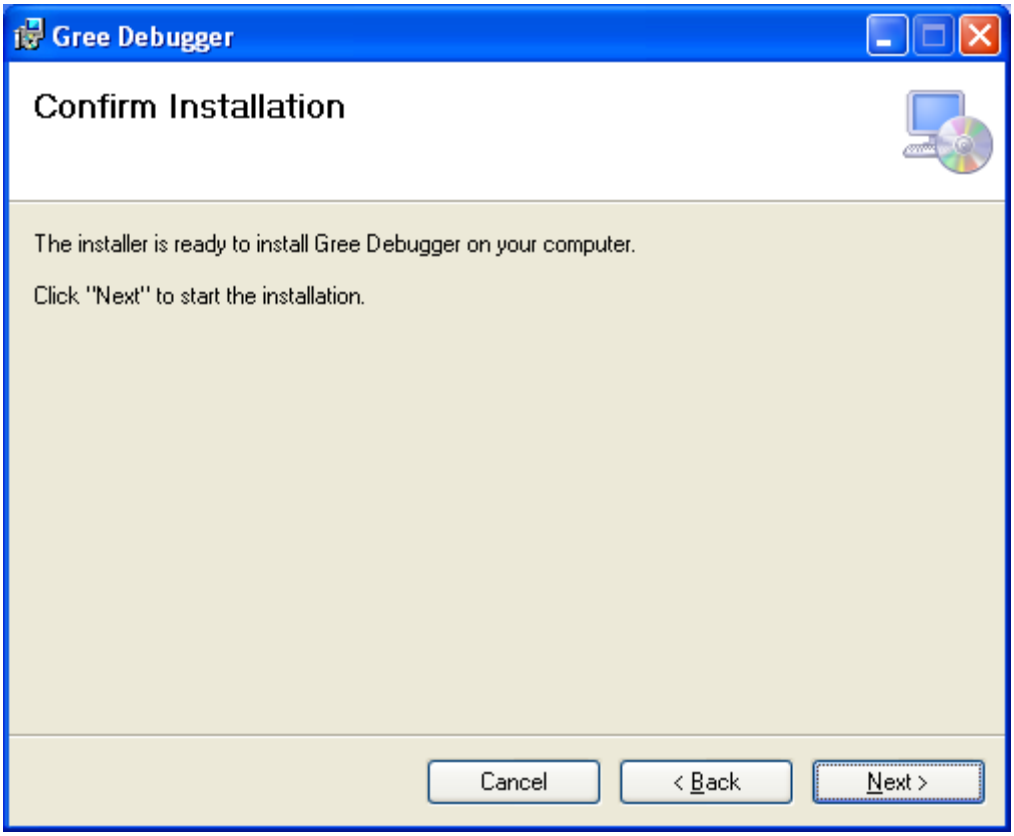
2) Click “Next”.



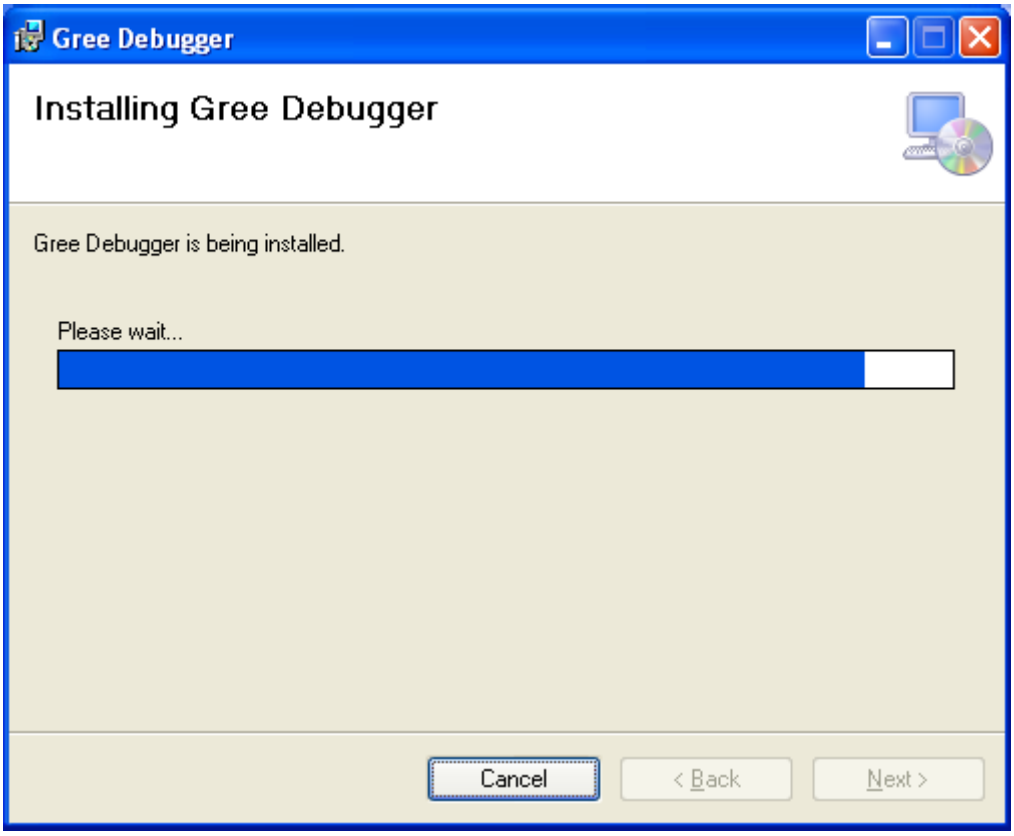
3) Click “Browse” to select installation folder. If no change is needed for the folder, click “Next” to continue the installation.



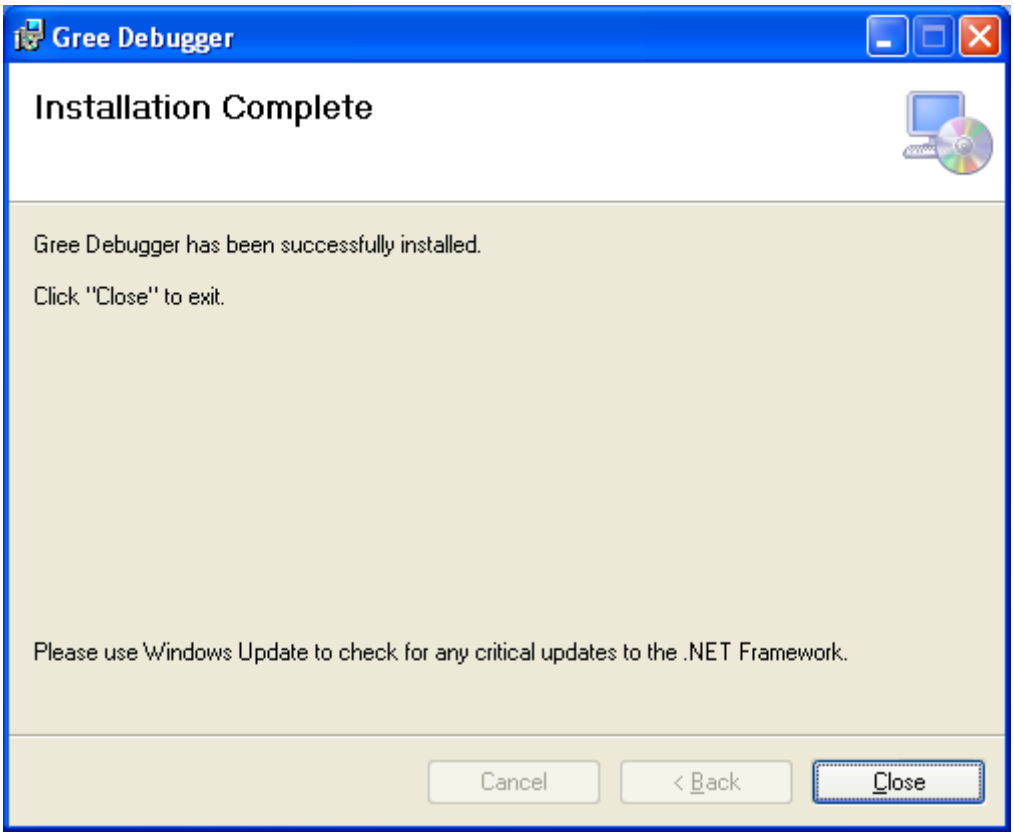
4) Click “Next”.



5) Installation is in progress.



6) Click “Close” to complete the installation.

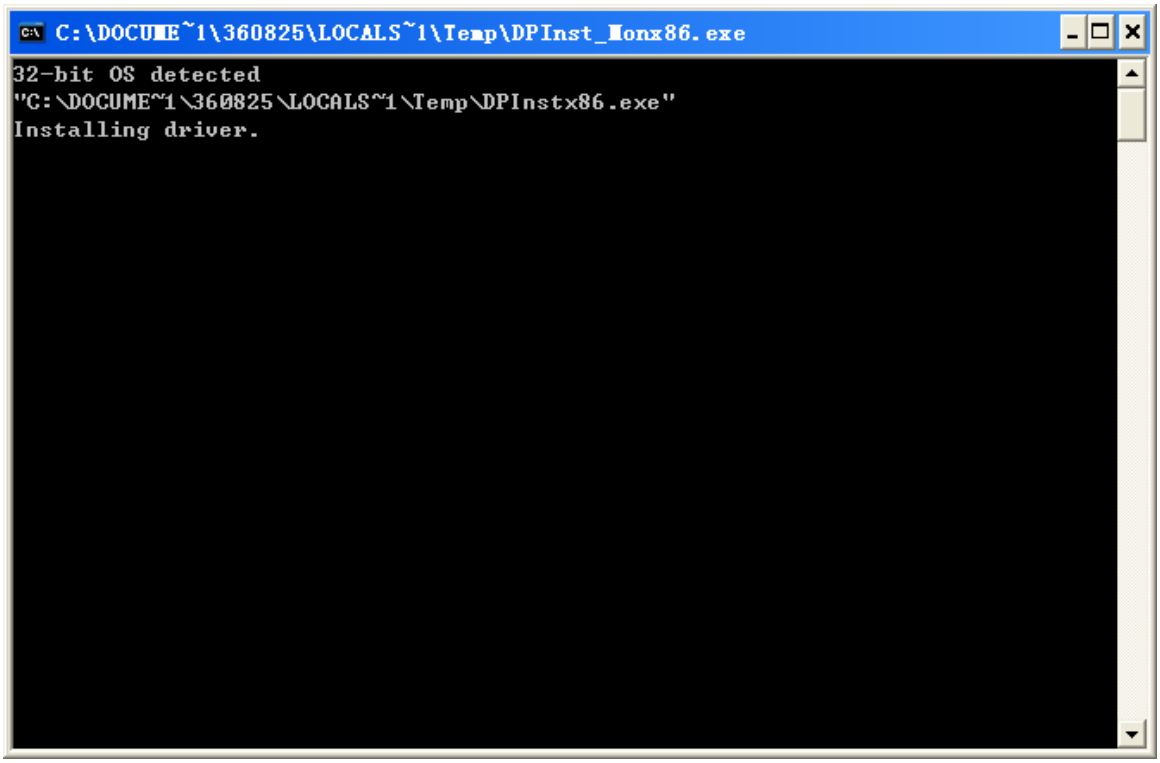


(4) Install USB Converter Driver

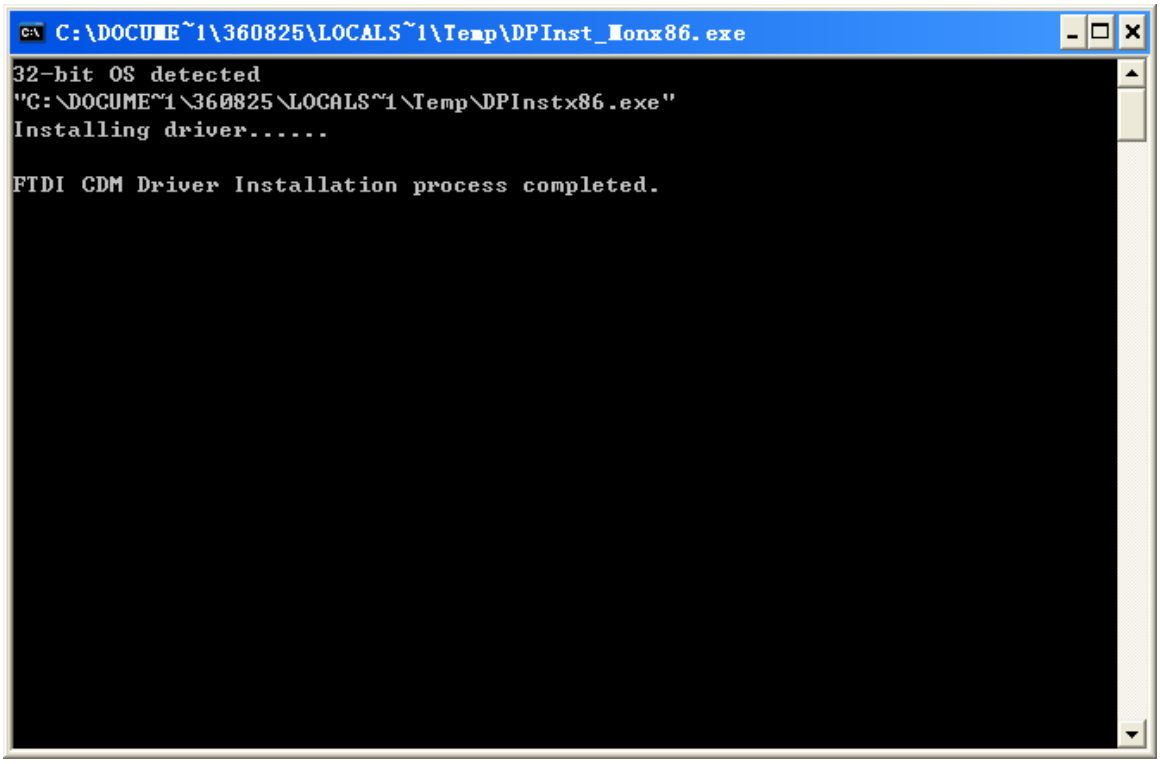
1) If USB converter driver is already installed in your computer, this part can be skipped. Otherwise, click “Install USB Converter Driver”.



2) Then the following installation window will be shown.



3) This window will exit after installation is finished.

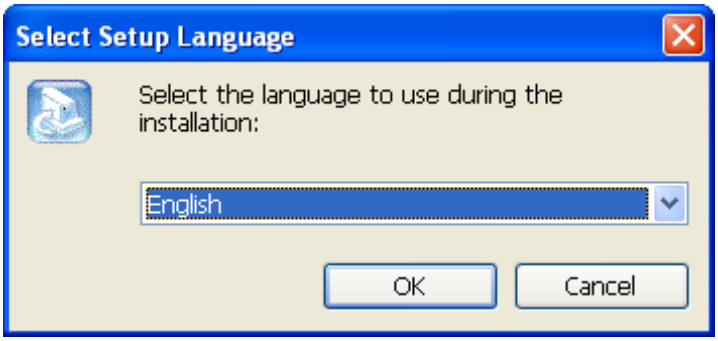


(5) Install Gree USB Data Converter

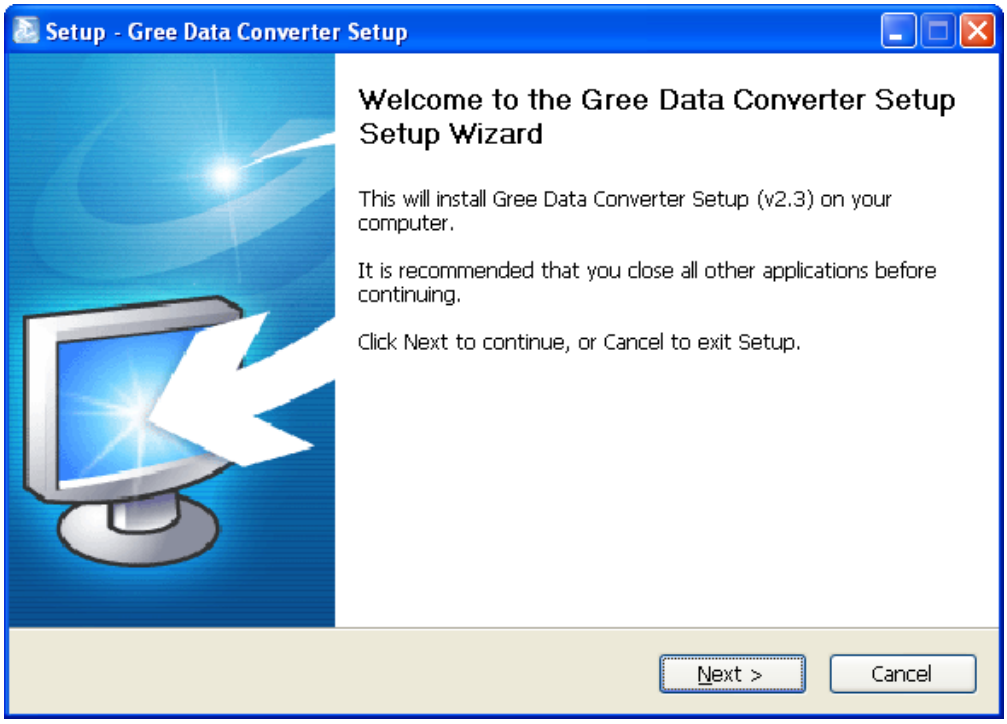
1) If converter baud rate is needed to be set, then converter configuring software must be installed. Click “Install Gree USB Data Converter”.



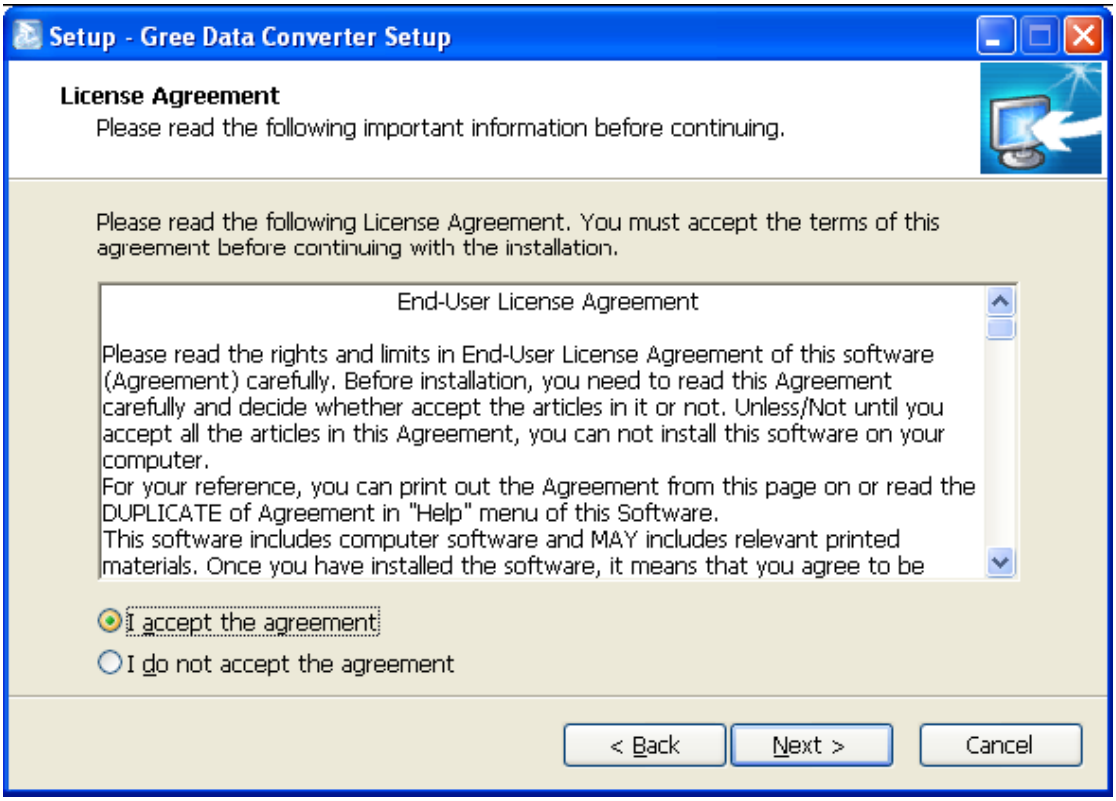
2) Then select the setup language. You can choose Chinese “simplified”, Chinese “traditional” or English. Then click “OK”.



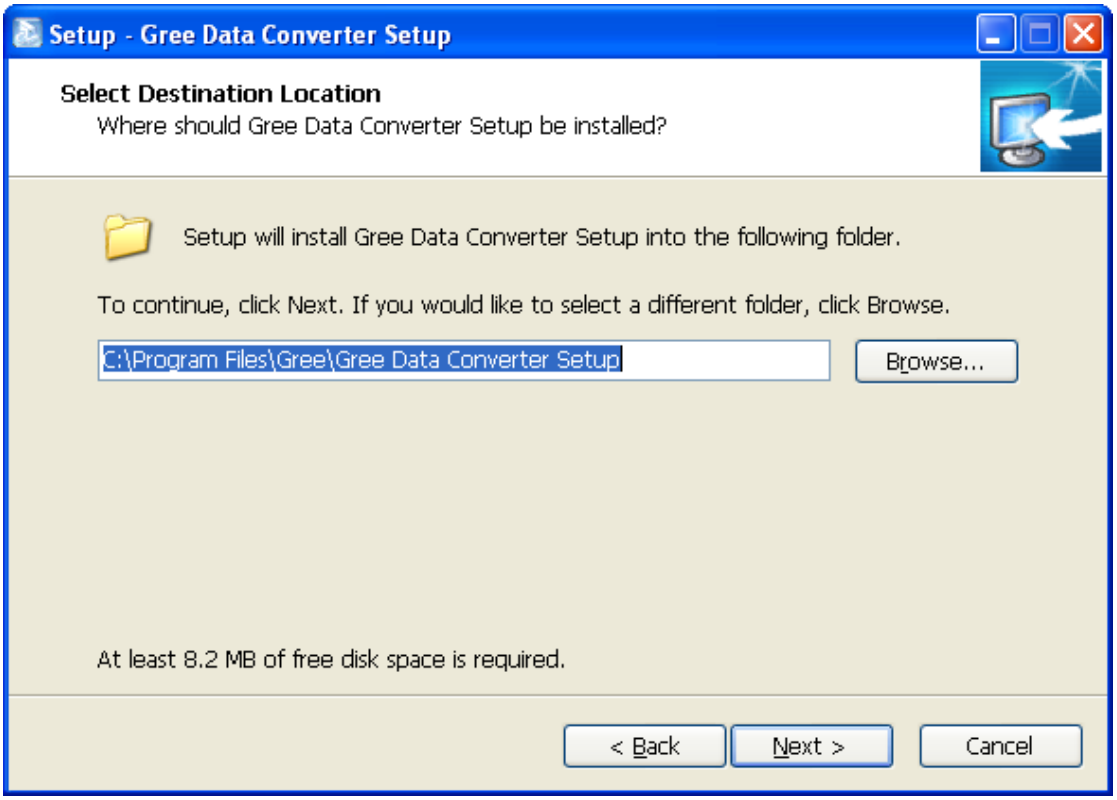
3) Click “Next”.



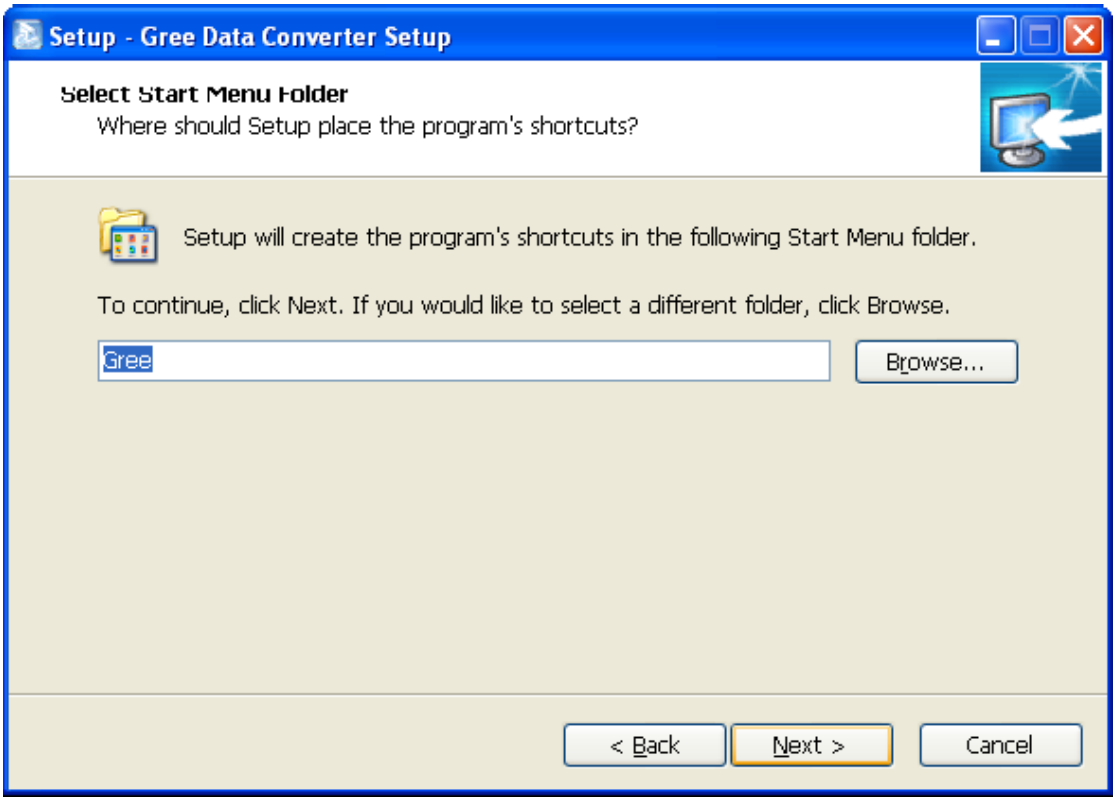
4) Click “I accept the agreement”. Then click “Next” to continue installation.



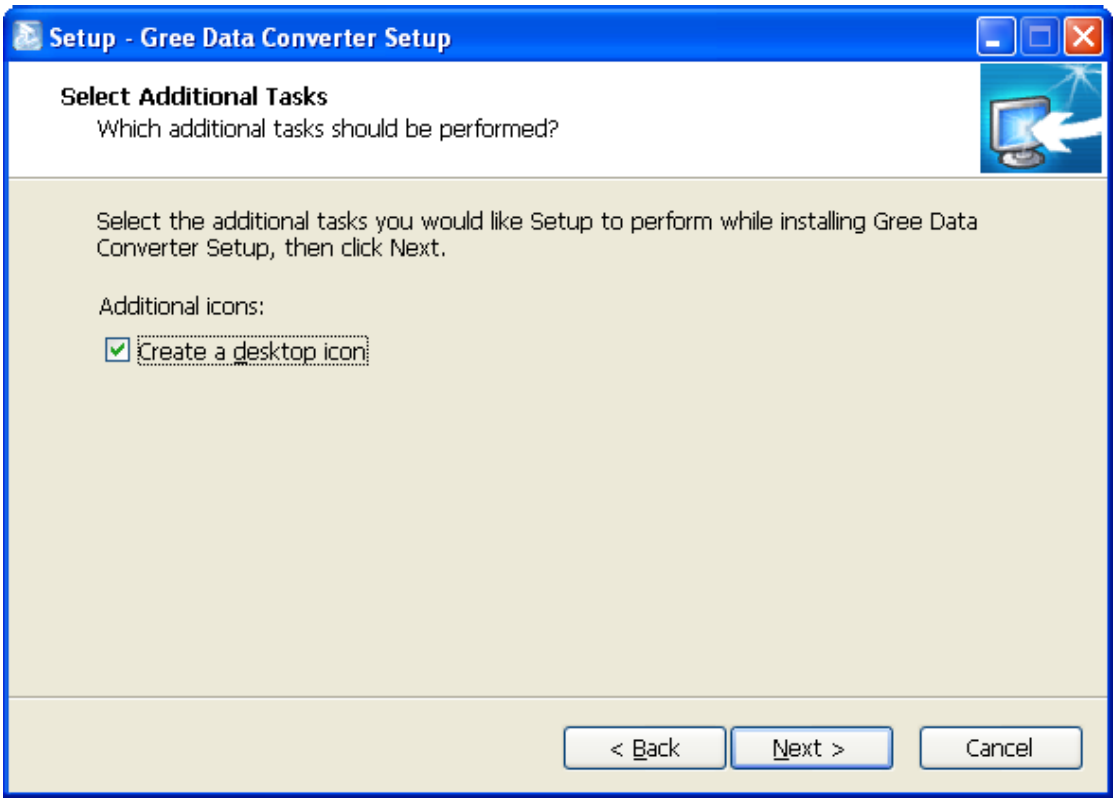
5) Click “Browse” to select your expected installation folder. Click “Next” to continue.



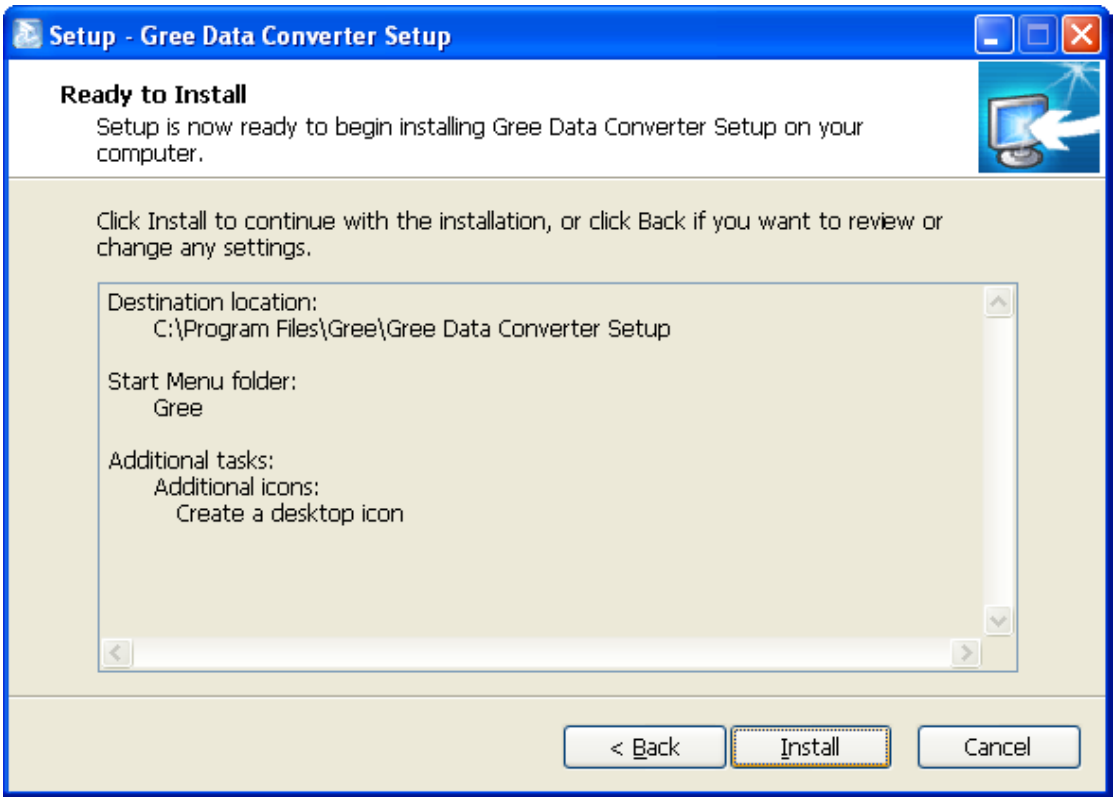
6) Click “Browse” to change folder. Click “Next” to continue.



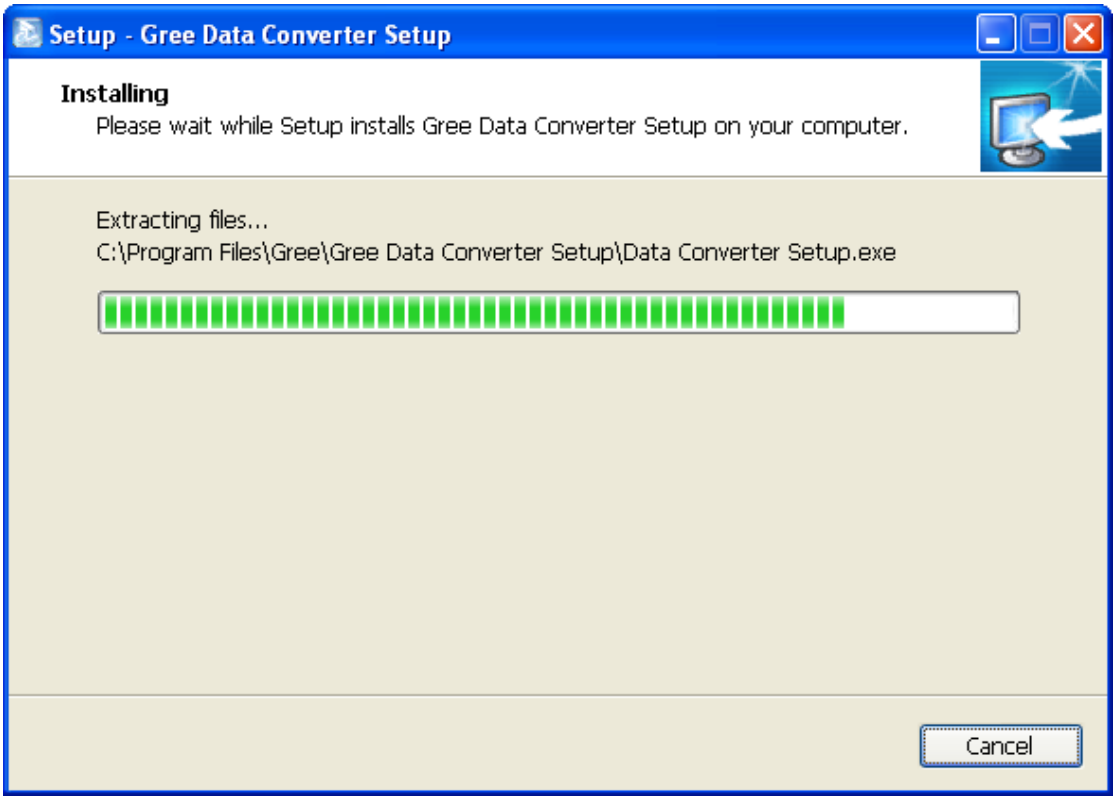
7) If you want to create s desktop shortcut, tick “Creat a desktop icon”. Then click “Next” to continue.



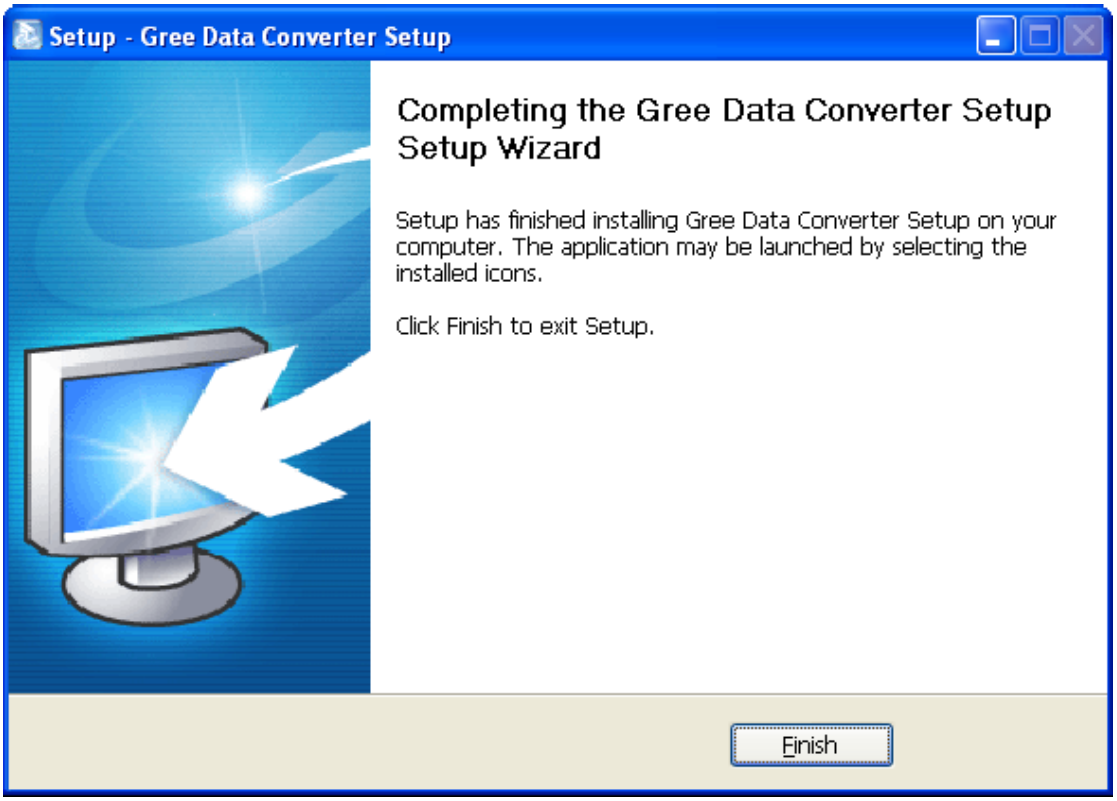
8) Destiniation location, folder and additional task will be shown in the next step. If you need to change any of it, please click “Back”. If not, click “Install” to start installation.



9) Installaiton is in progress.



10) Click “Finish” to complete the installation.

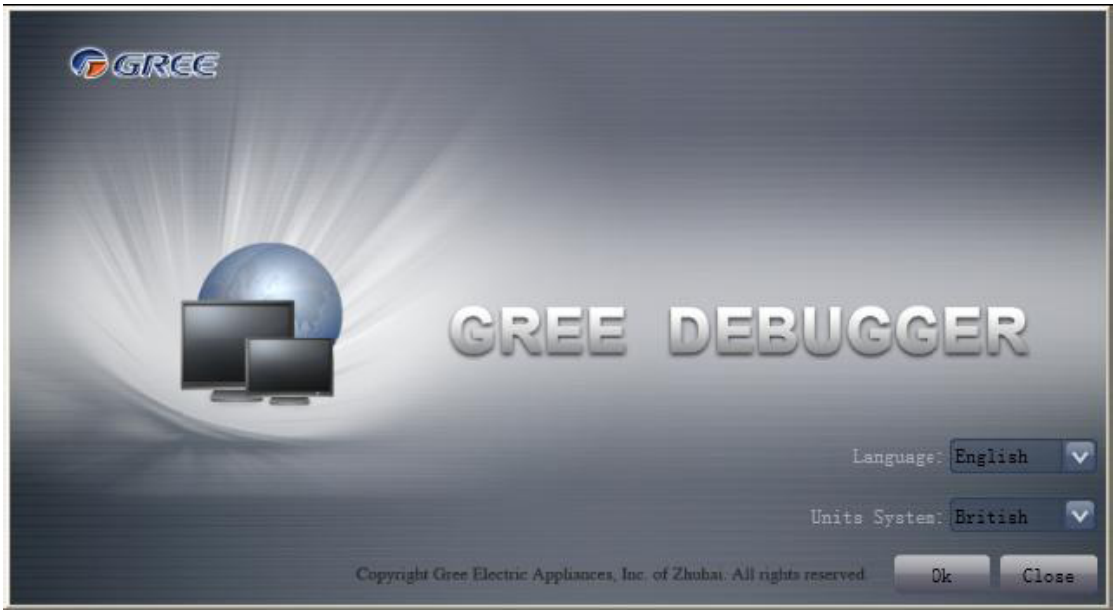


3.4.2 Data Monitoring

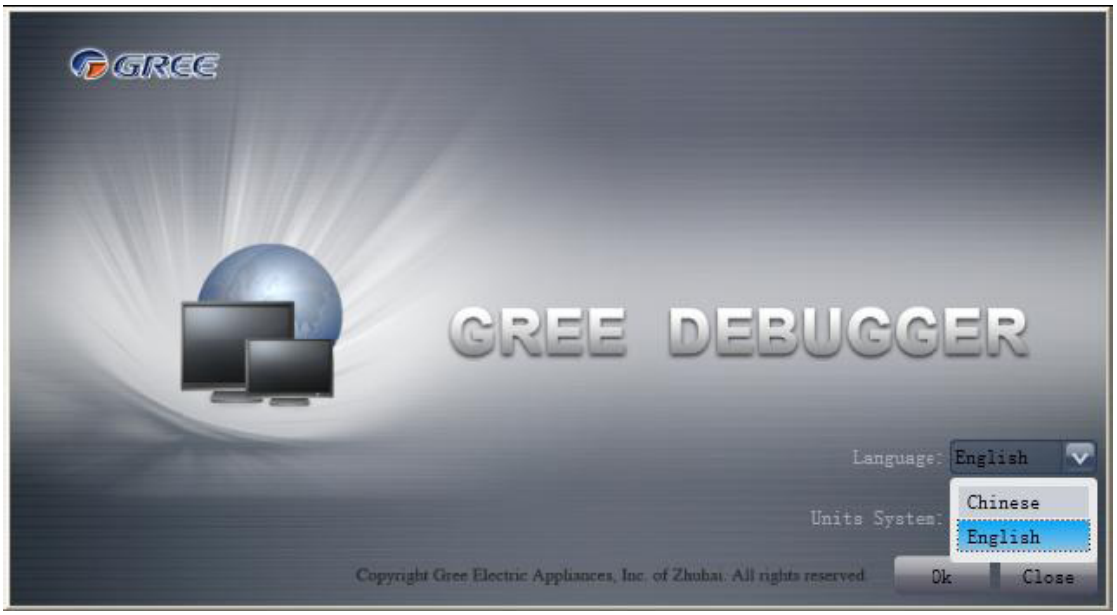
(1) Start up Gree Debugger.



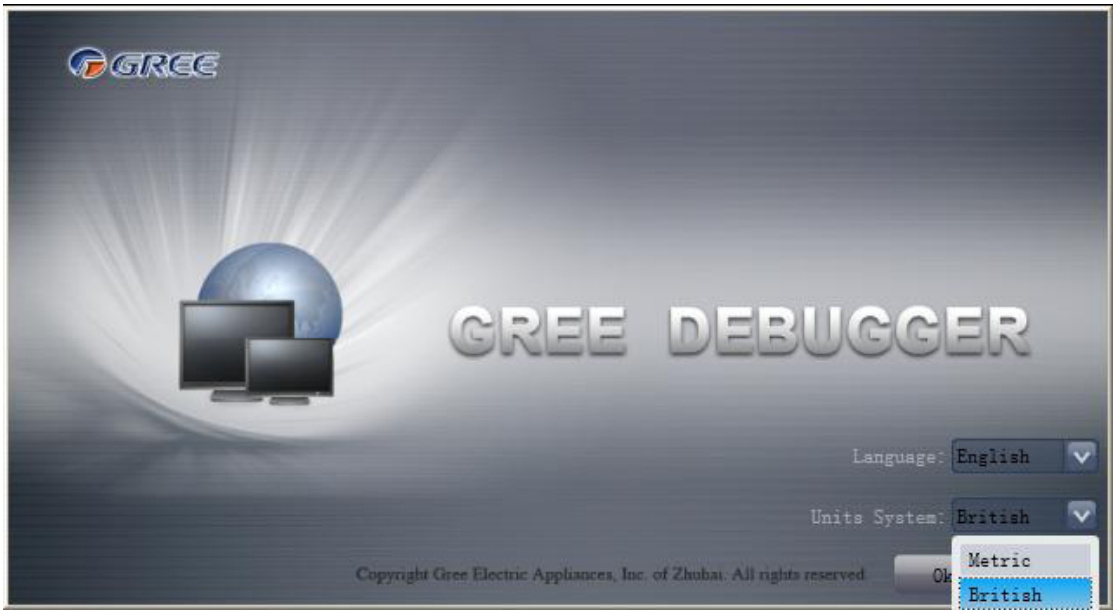
(2) On the original interface, user can select language and units system. Click “OK” to confirm the defaulted language and units system and start up the software.



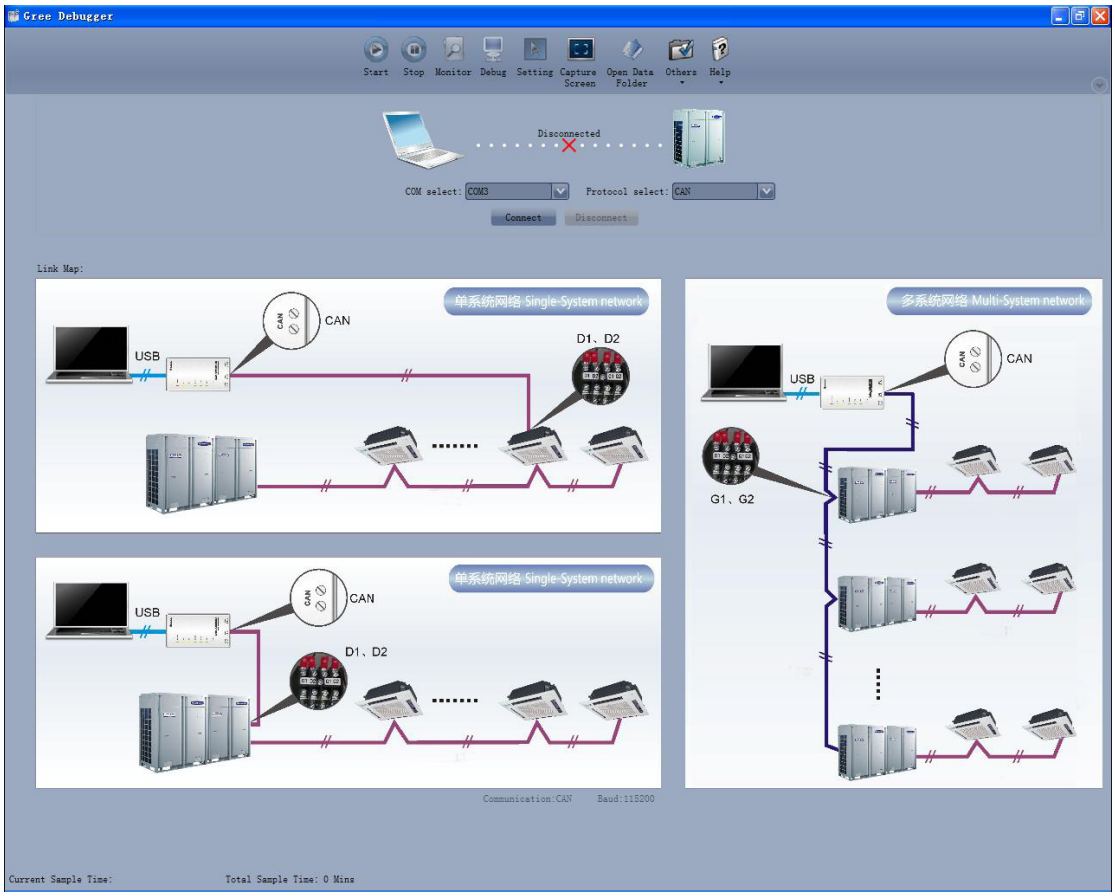
(3) Select language.



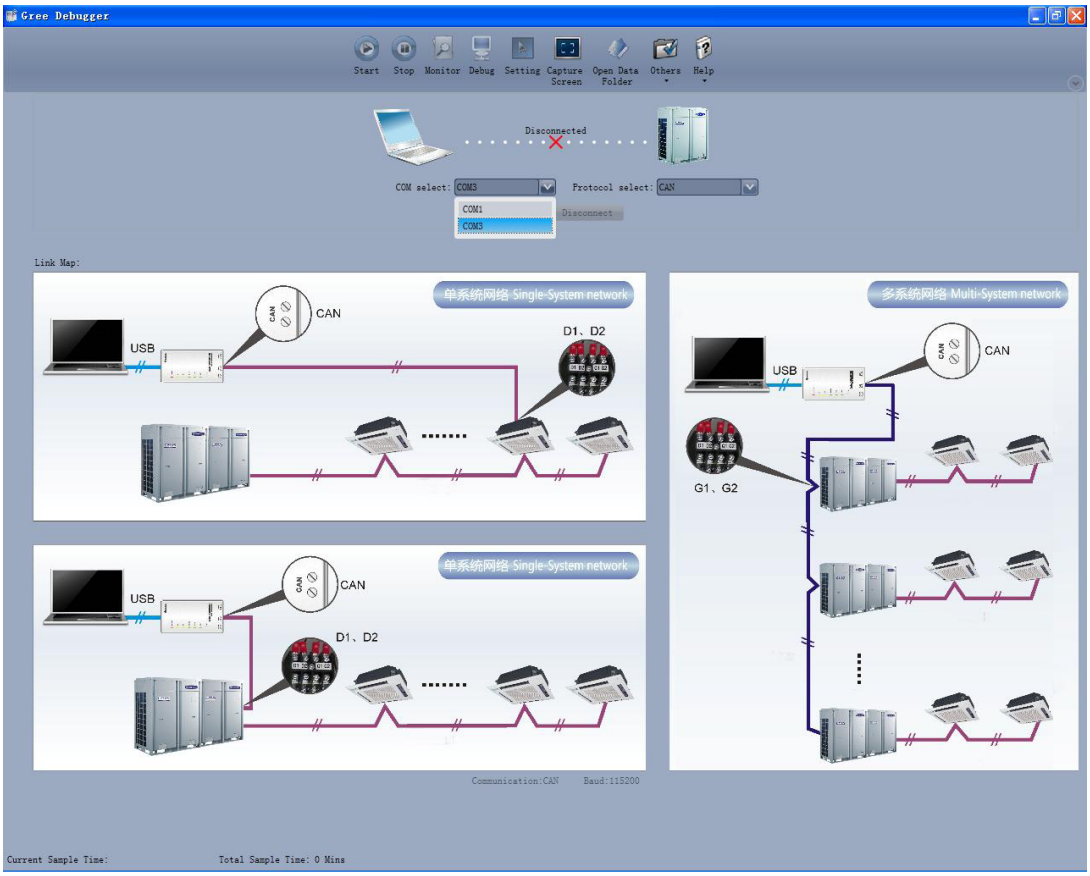
(4) Select system of units.



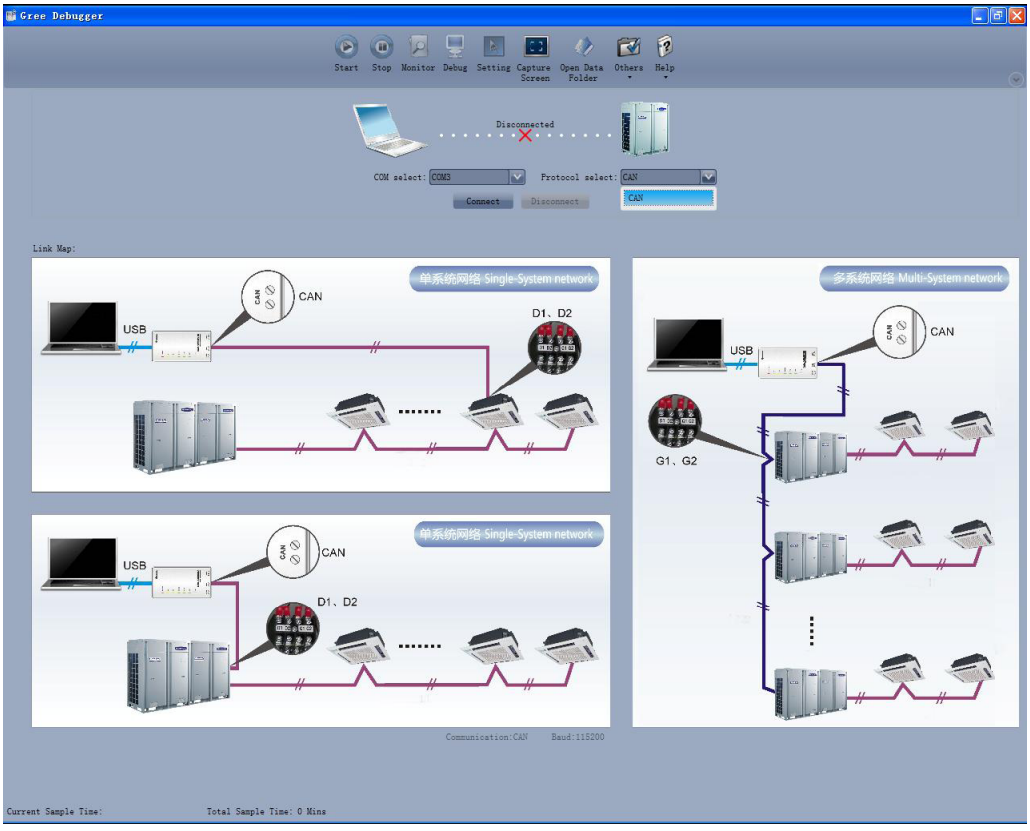
(5) If units you want to monitor are already connected, and able to communicate normally, with correct COM and protocal, then you may click “Connect” to enter the interface of numbers. Otherwise, connect in accordance with the connection diagram shown below.



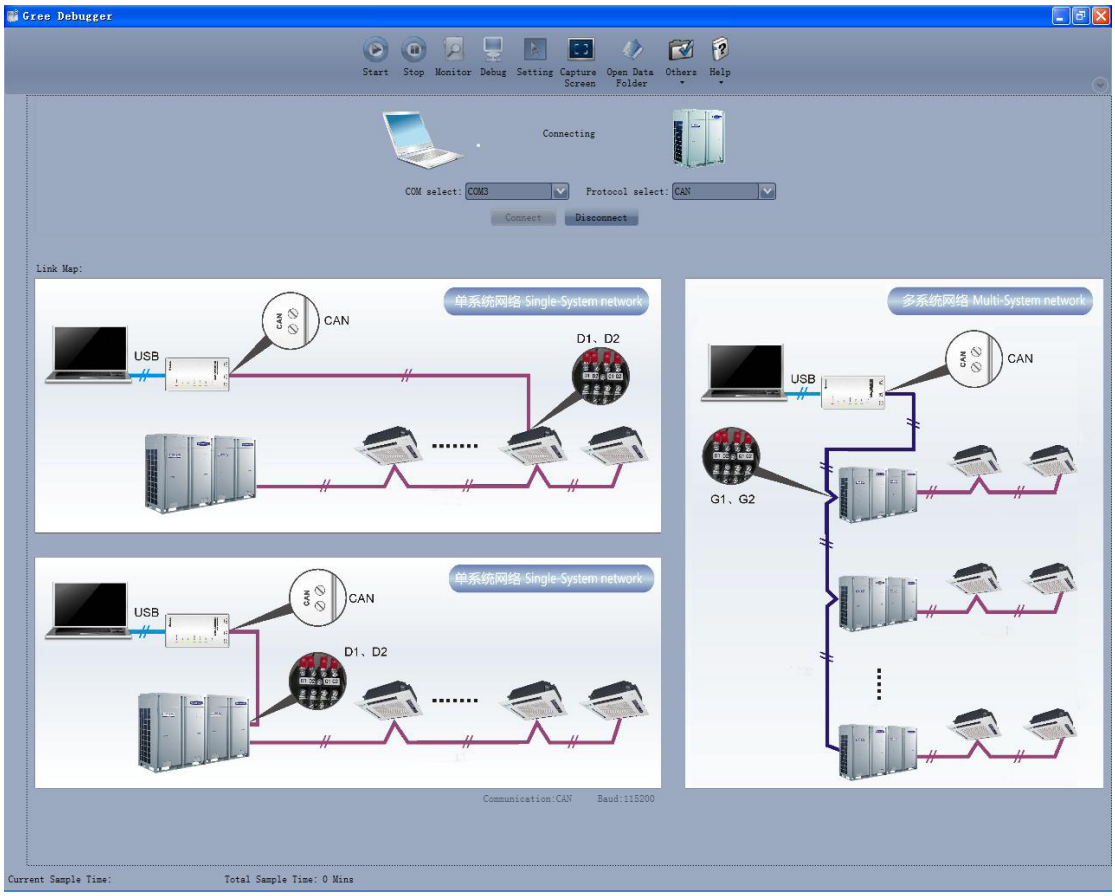
(6) COM selection: the serial port in your computer can be detected automatically. You just need to select your desired serial port.

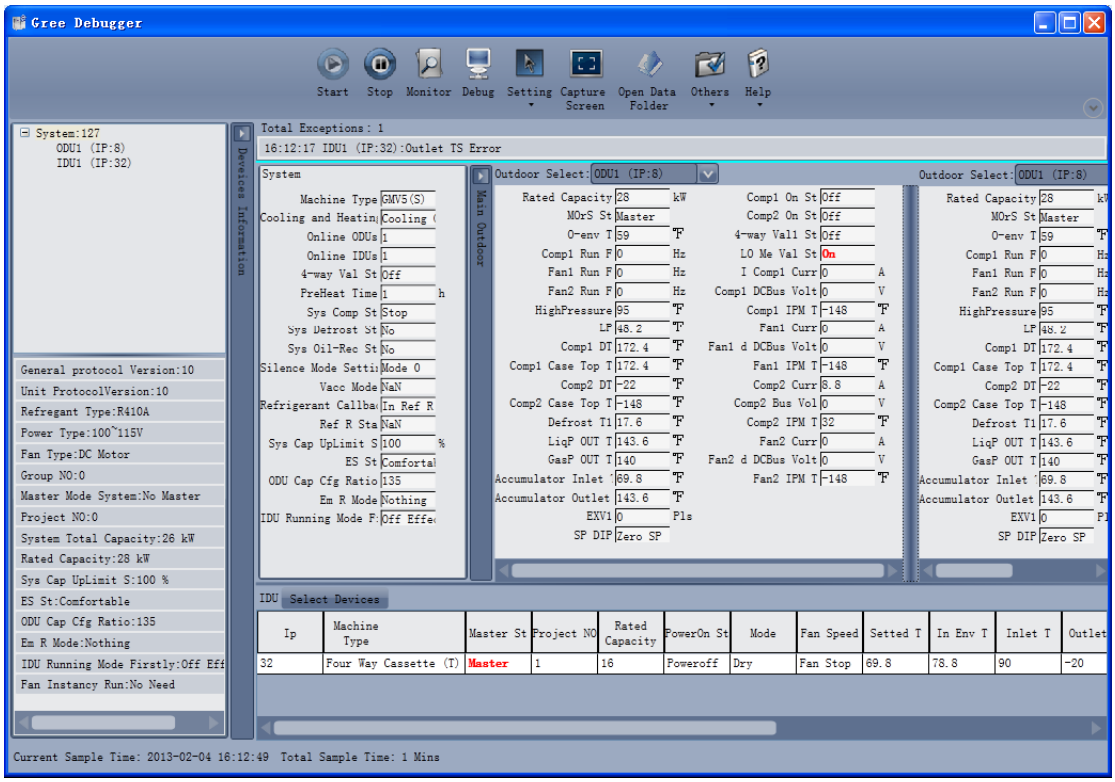


(7) Protocal selection: This is to select the communication method of your units. Currently, CAN is applicable to the units.

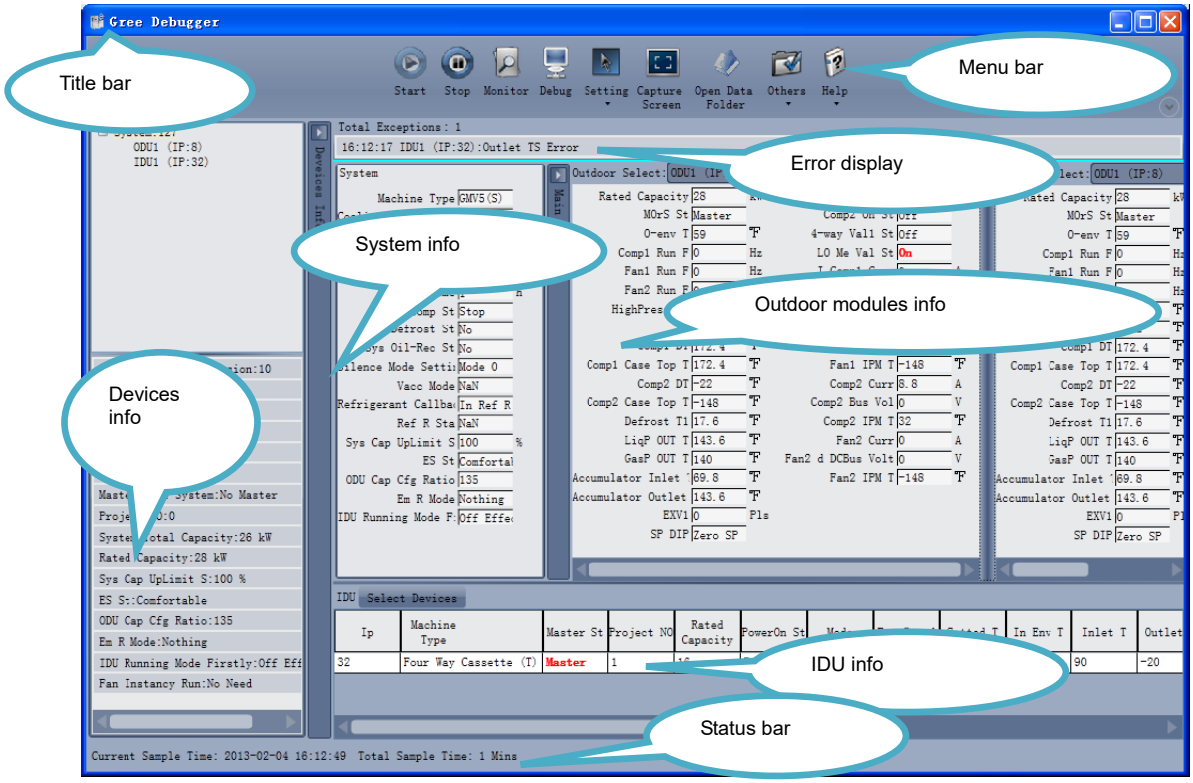


(8) After the selection, click “Connnect”. If units can communicate normally with computer, then the interface of numbers will be shown soon. Otherwise, “Connecting” will be shown.

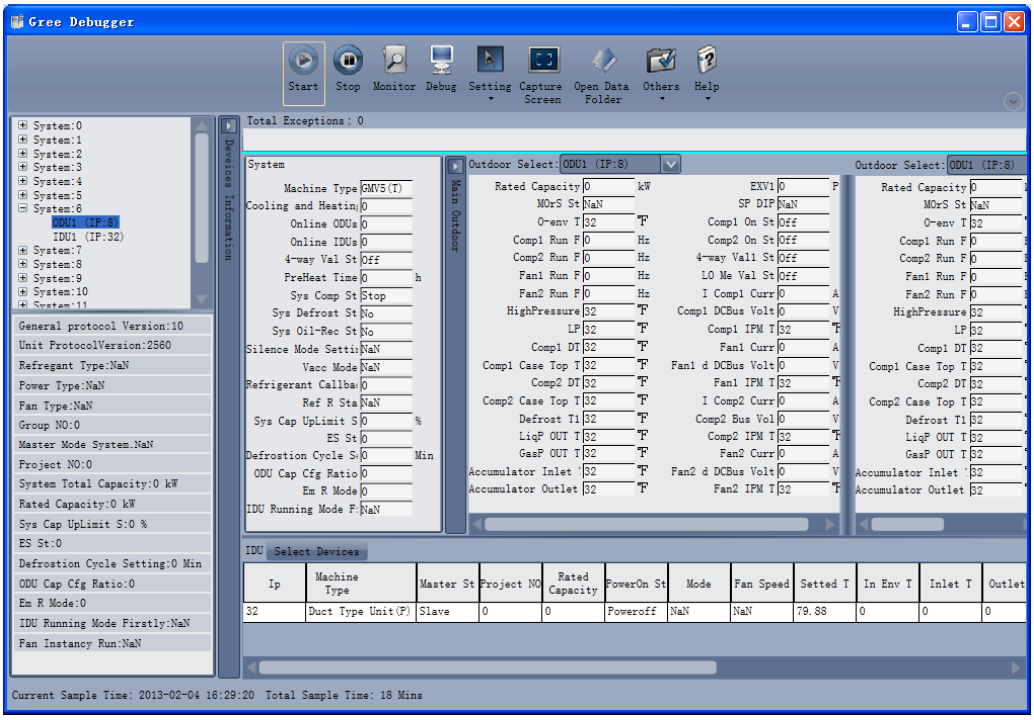




(9) There are several display zones on this interface. You can hide devices information and system information by clicking devices information icon and system icon . Display zones of indoor unit information and errors can be dragged up and down at the dividing lines. As to the display zone of outdoor modules information, it can show information of only one module and hide information of others (two modules are defaulted to be shown). Menu bar can be hidden by clicking icon . Status bar shows the current time and period for data collection.



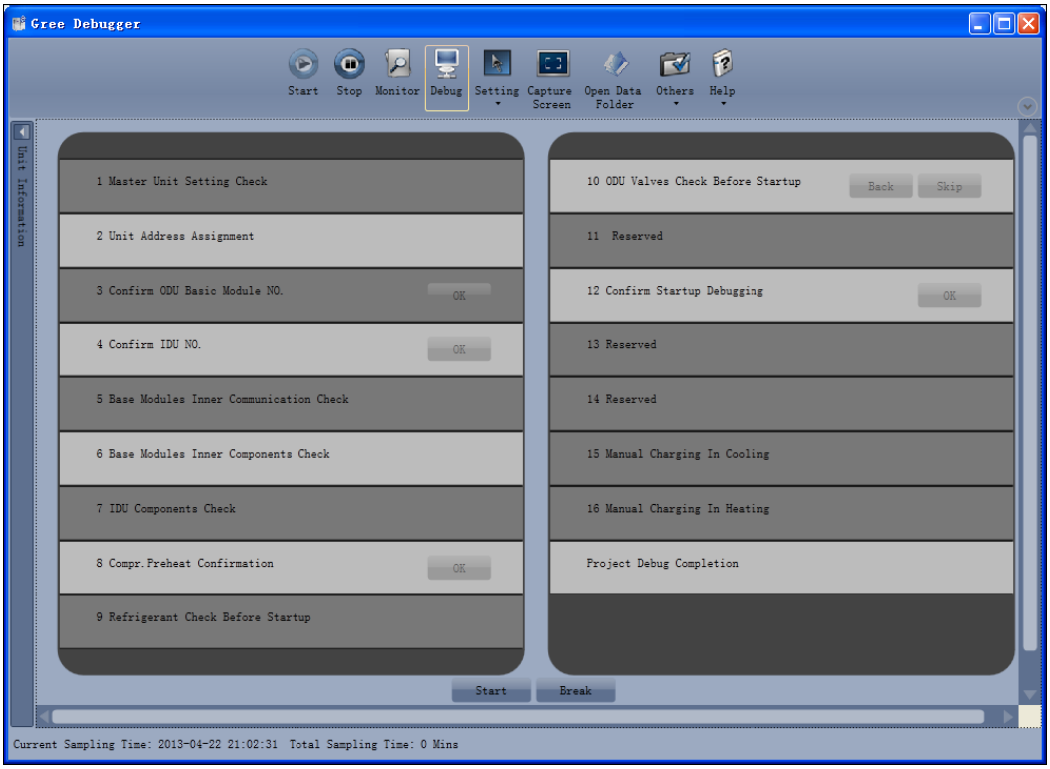
(10) On the display zone of devices information, you may click to select and view units that need monitoring.



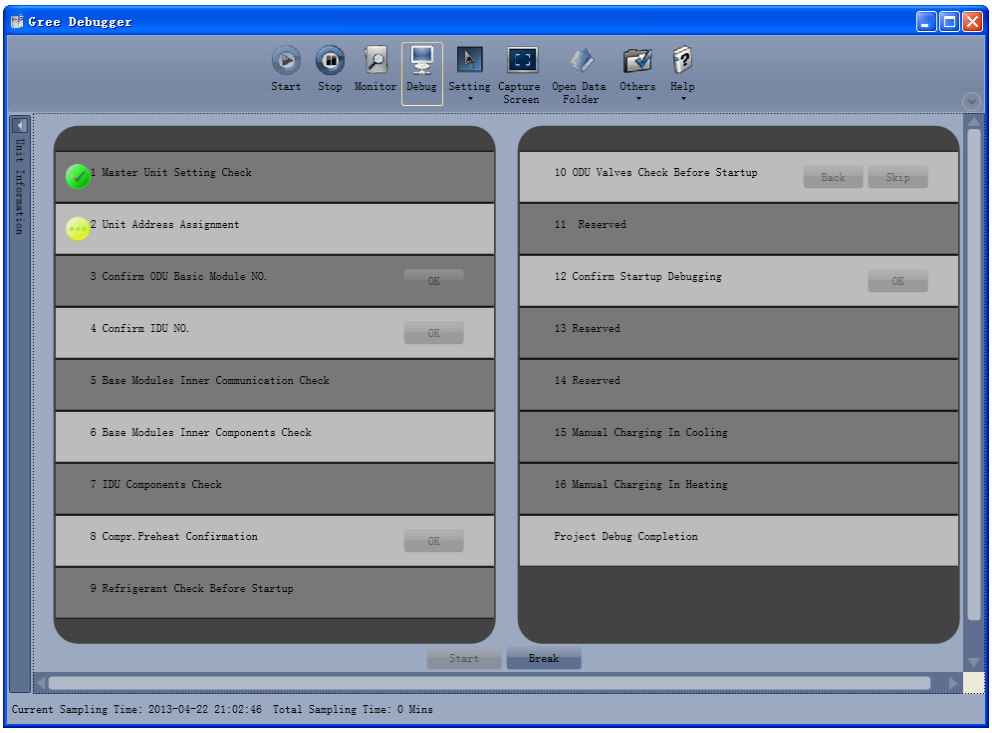
3.4.3 Project Debugging

(1) Click icon of “Debug” on the menu bar and the interface will be switched to project debugging, where auto debugging will be started from up to down and from left to right.

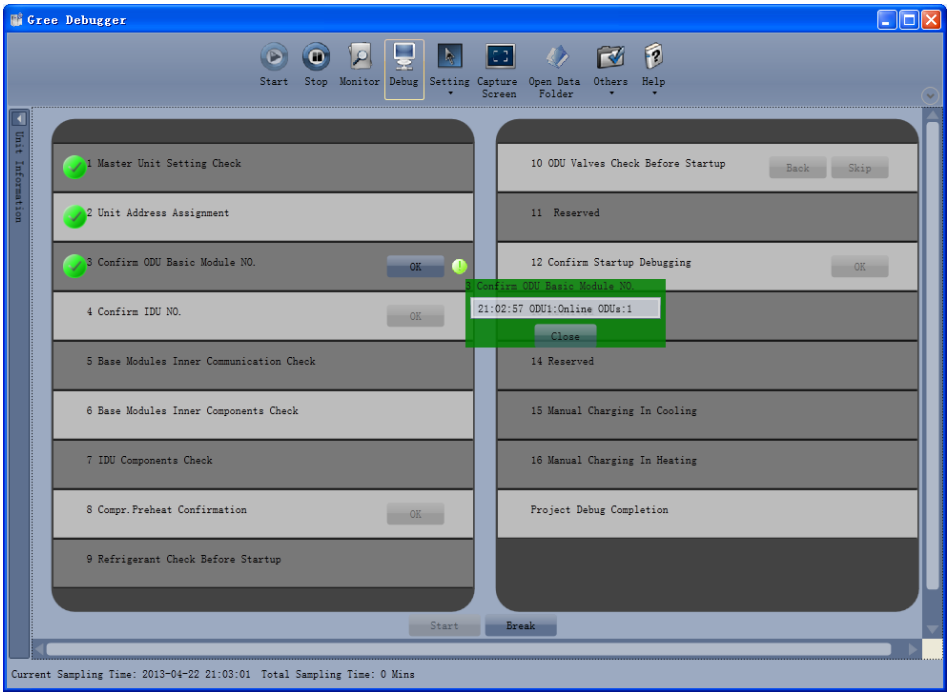
NOTE: Debugging function is only applicable to a single-system network.



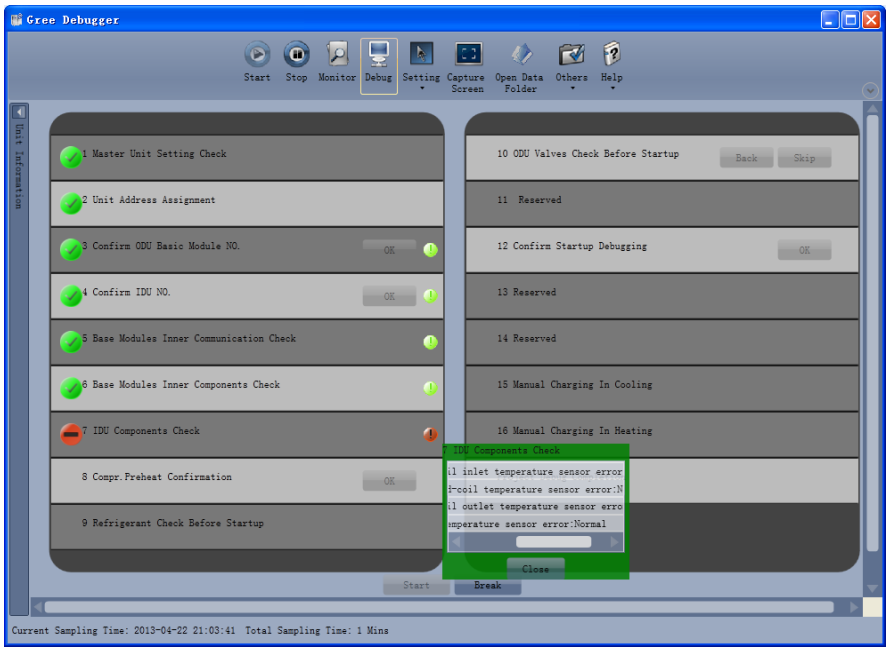
(2) Click “Start” to enable the debugging function. Then debugging will be started up automatically.  indicates that debugging is in progress while  indicates debugging is completed.



(3) If “OK” button is displayed, it means user needs to judge whether to continue debugging or not. Click icon  and relevant information will be shown for your reference. Click “Close” to close the pop-up (For No.3 Confirm ODU Basic Module NO. and No.4 Confirm IDU NO., the current number of units under debugging will be displayed. See the following marked with circle. For No.8 Compr. Preheat Confirmation, the preheat time will be displayed. See the following marked with circle).



(4) Icon  indicates that there is problem found during debugging. Debugging will not be completed unless problem is solved (after problem is solved, step without “OK” button will switch to the next step automatically, otherwise user needs to click “OK” to continue). Click icon  and relevant information detected in this step will be displayed for your reference in order to solve problems. Click “Close” to close the pop-up.

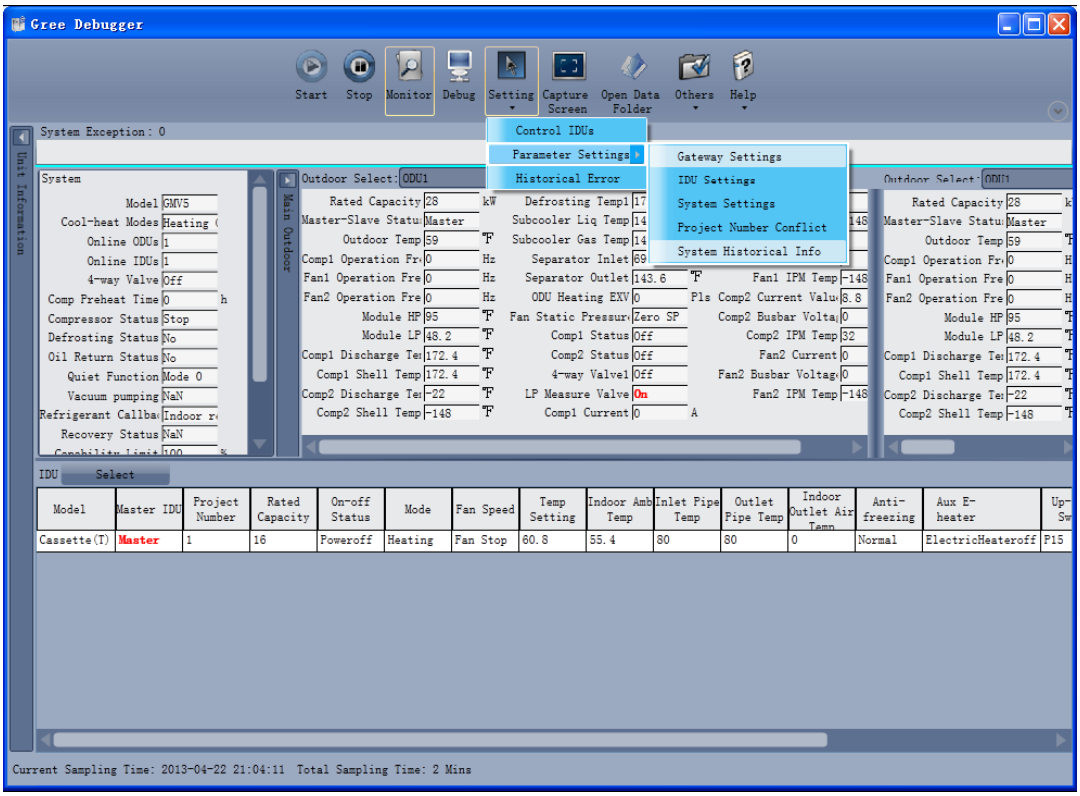


(5) During debugging, a click on “Break” can stop debugging. Click “Start” to resume debugging and then debugging will be finished step by step. For No.10 ODU Valves Check Before Startup, there are “Back” and “Skip” buttons. If there is error in this step, you can back to step No.9 and click “OK” to restart debugging on step No.10. If the error in step No.10 is U6 error (valve error alarm), you can click “Skip”. In other cases, “Skip” button is null.

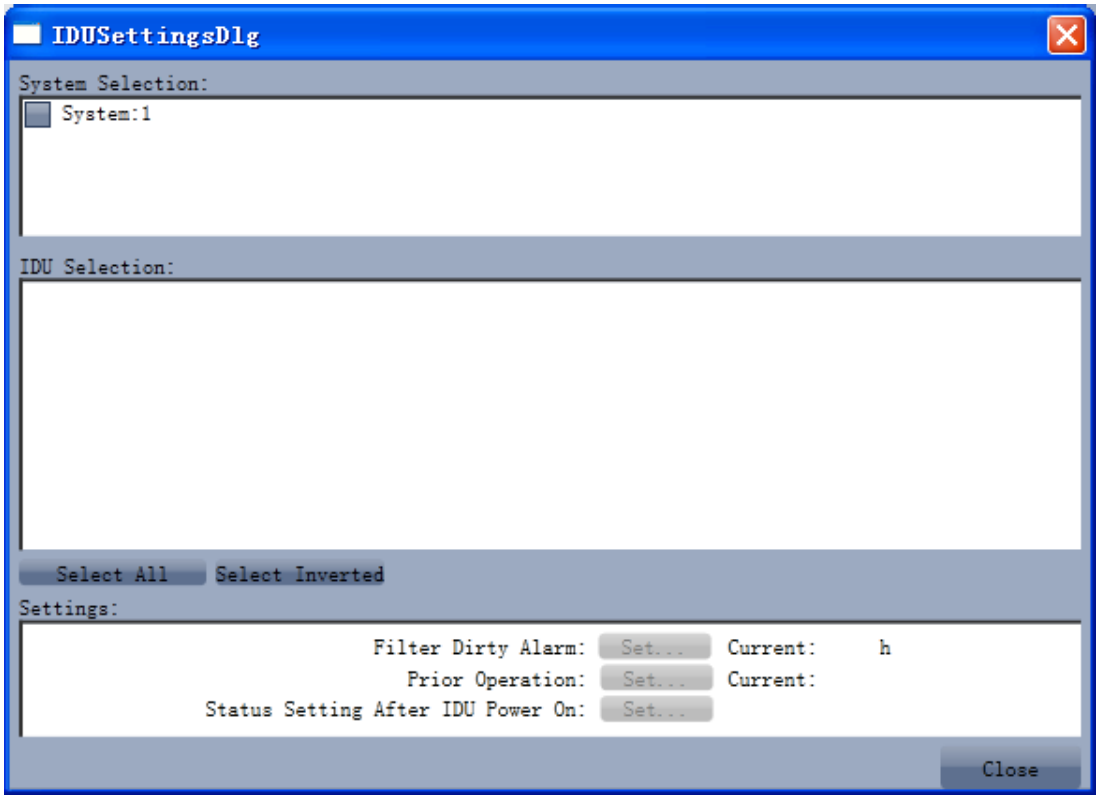
(6) Step 11, 13 and 14 are reserved steps. And step 13, 14, 15 and 16 are steps in parallel (only one of the four will be selected according to actual needs).

3.4.4 Control Units

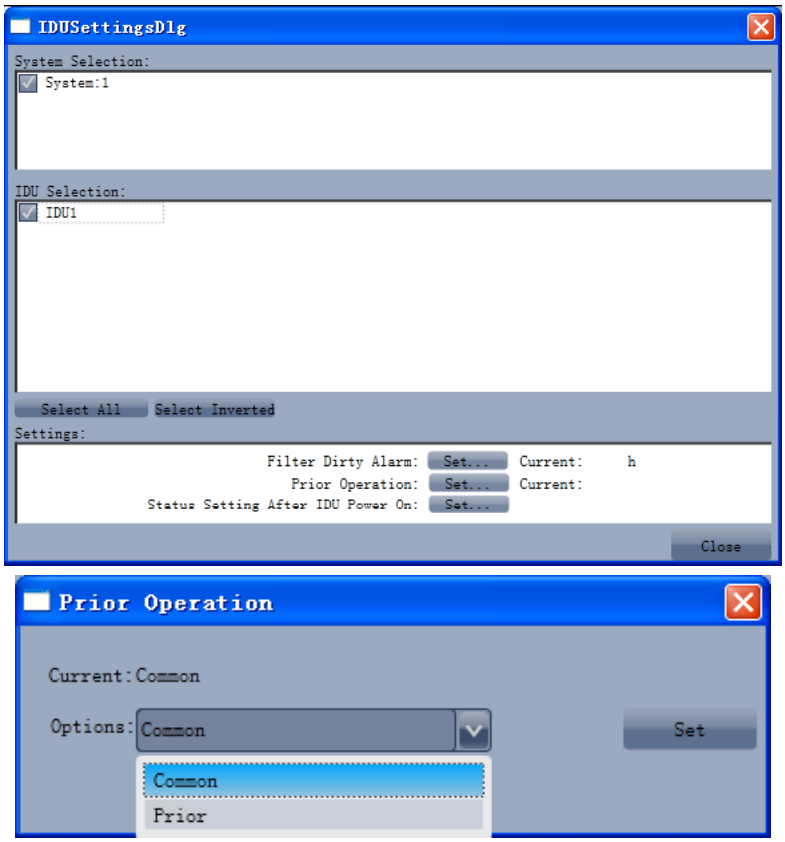
(1) Click icon of “Setting” on menu bar and select parameter settings, which include “Gateway Settings”, “IDU Settings”, “System Settings”, “Project Number Conflict (In case there is project number conflict in indoor units, other functions will be shielded. Then this parameter needs to be set in order to eliminate the conflict)” and “System Historical Info”. Click the corresponding set and adjust the parameters.



(2) Take indoor unit as an example. Click “IDU Settings” and a dialog box will pop up.



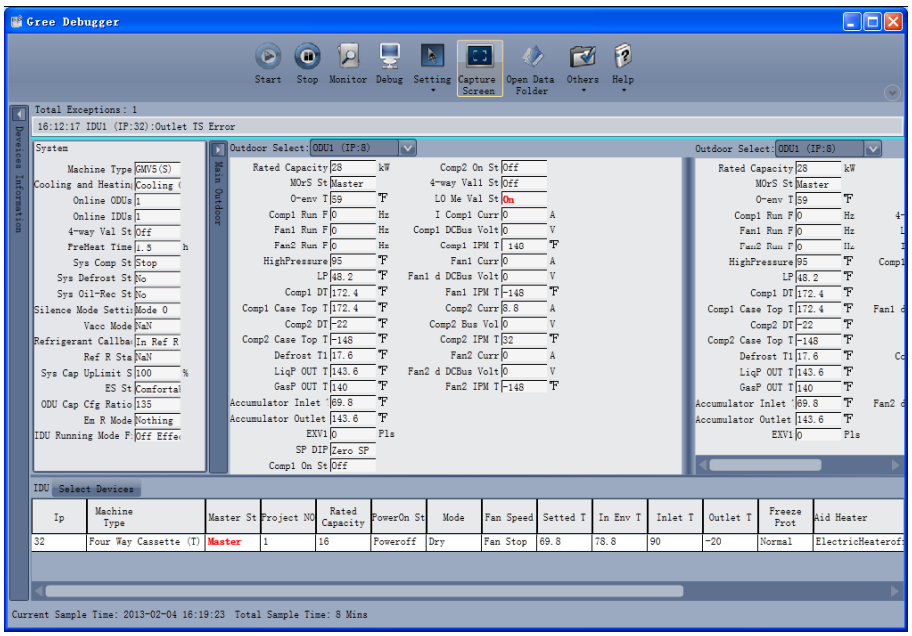
(3) Tick the indoor units that need setting in the IDU selection zone or you may click “Select All” to select all of them or “Select Inverted” to select none of them. After selection, the current values of the corresponding parameters will be displayed in the zone of settings. Click “Set” and then click  in the pop-up dialog box to select values. Click “Set” and then the corresponding order will be sent to units. If setting is successful, it will be displayed at the current values.

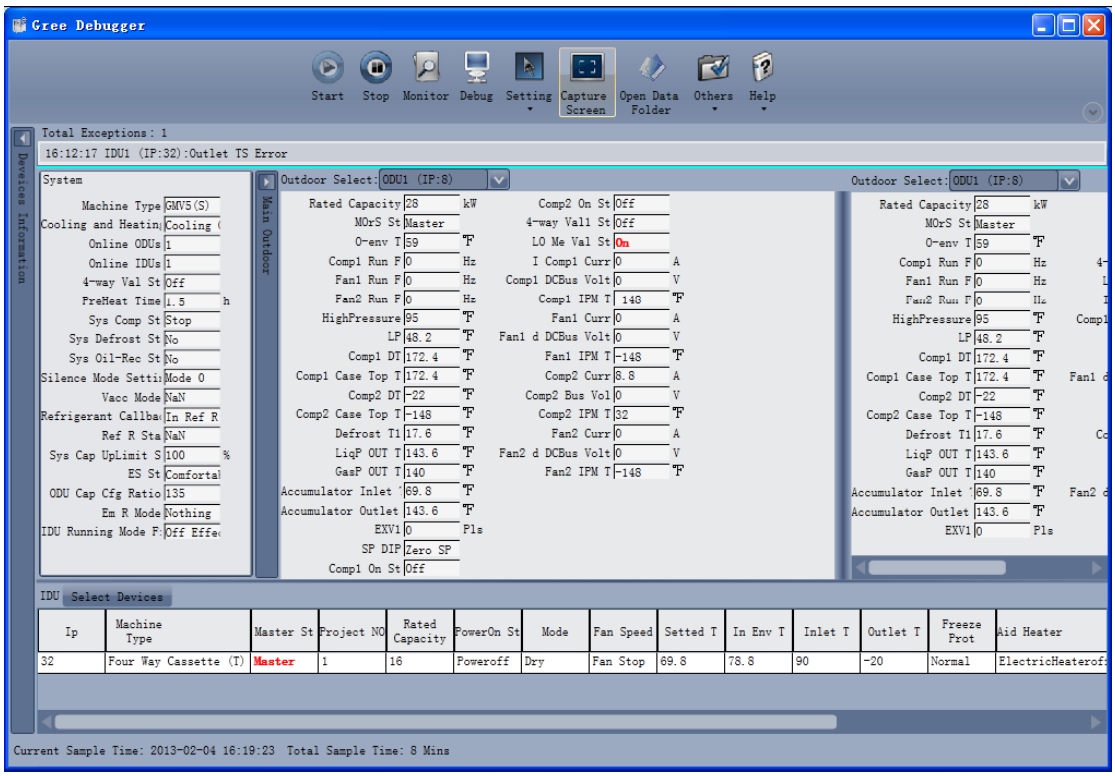


3.4.5 Other Functions

Capture screen

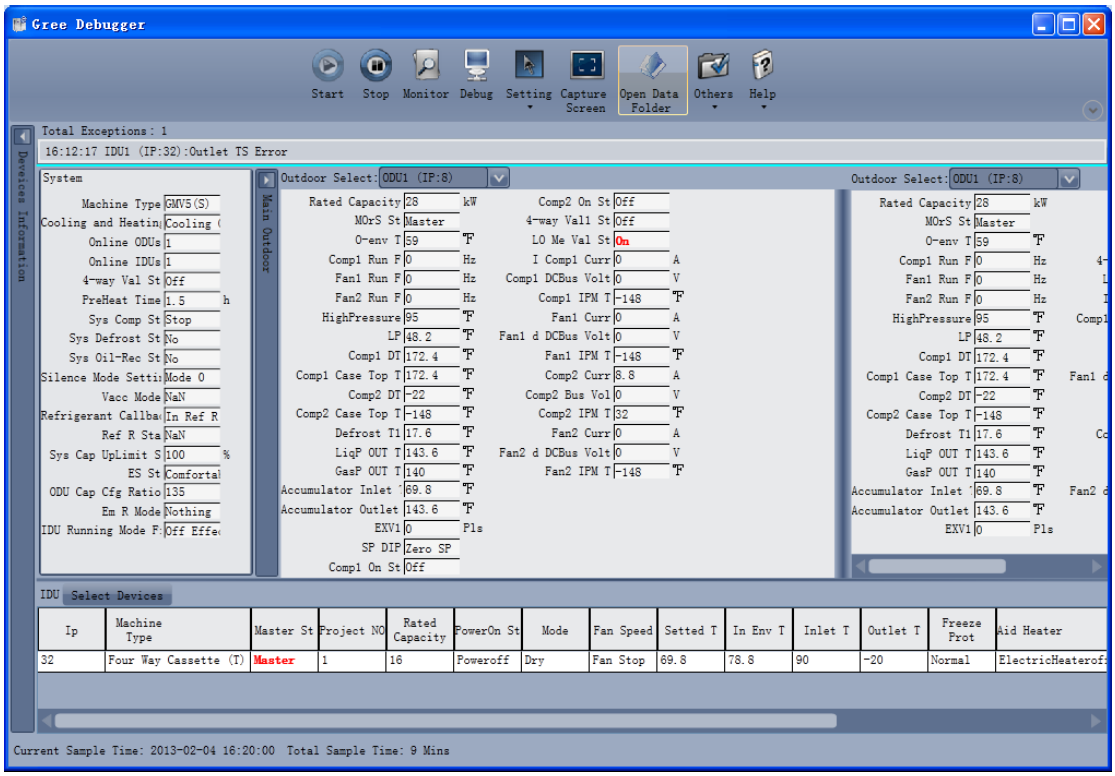
(1) Click icon of “Capture Screen” to print the interface. If you want to open the interface, click “Open”.

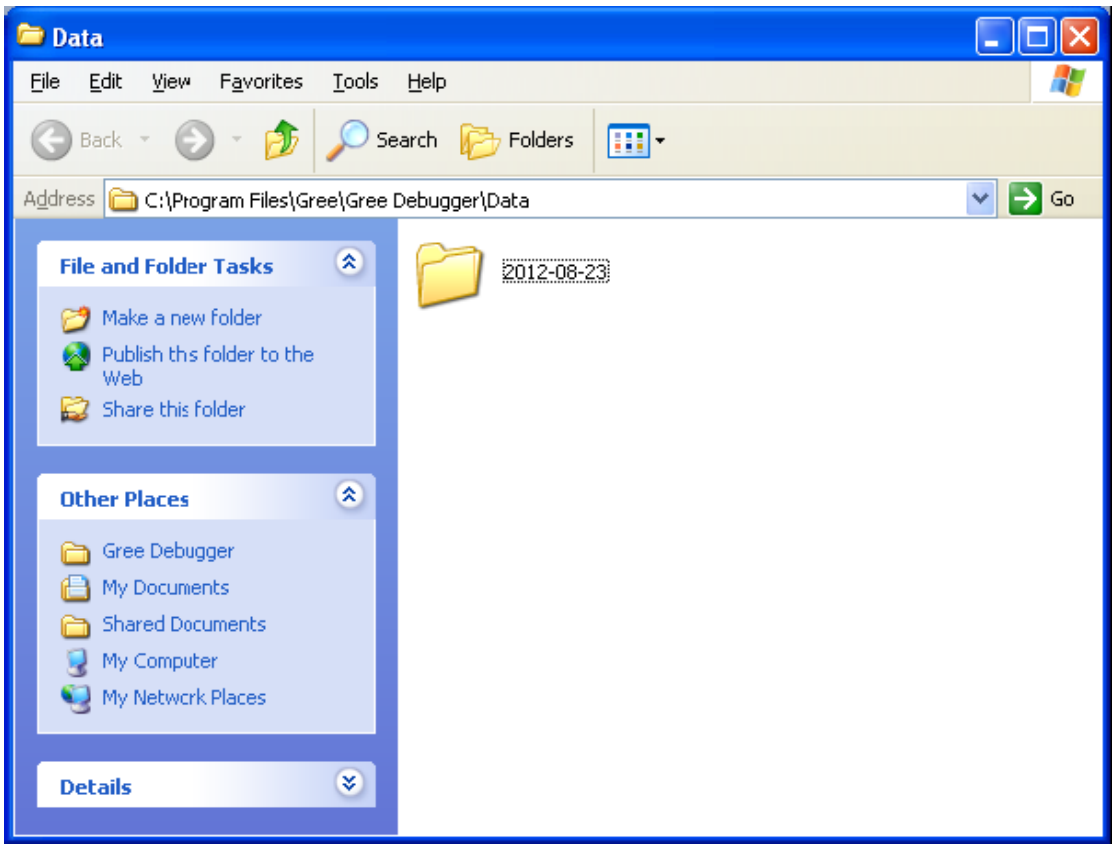




Search for database folder

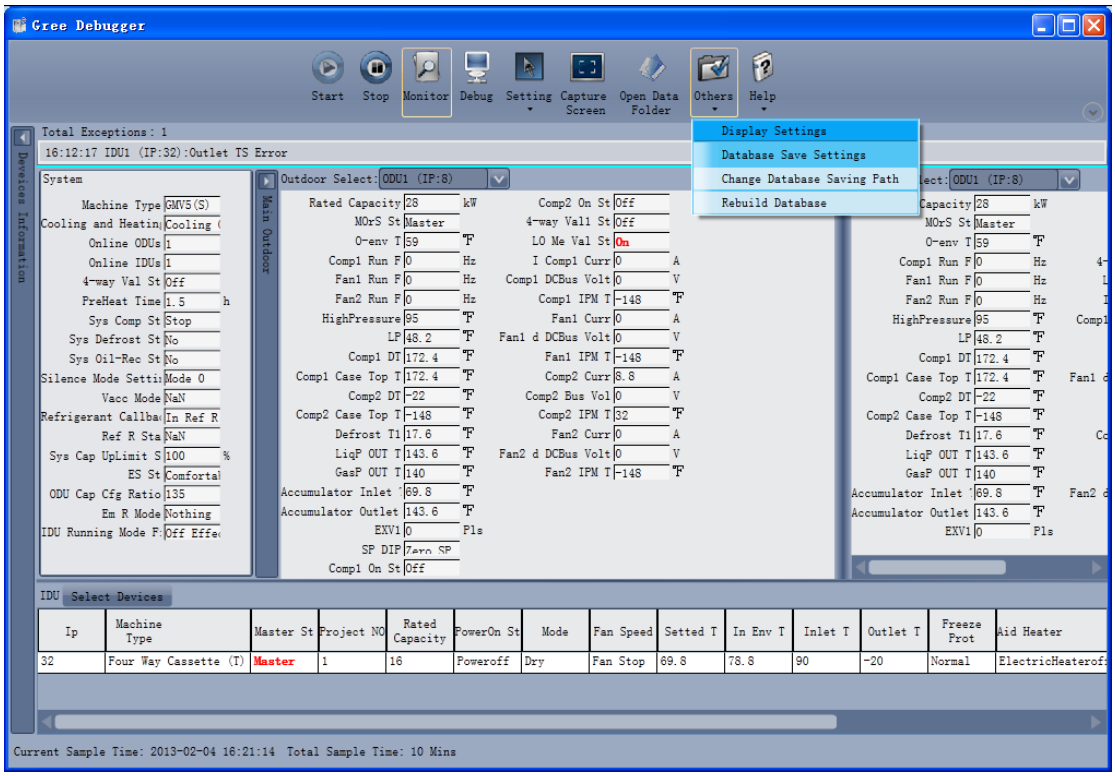
(2) Click icon of “Open Data Folder” on the menu bar to open database folder.

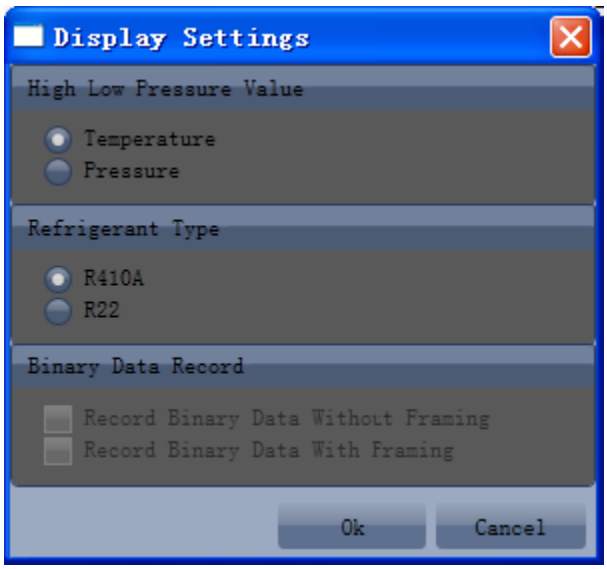




Conversion of pressure value

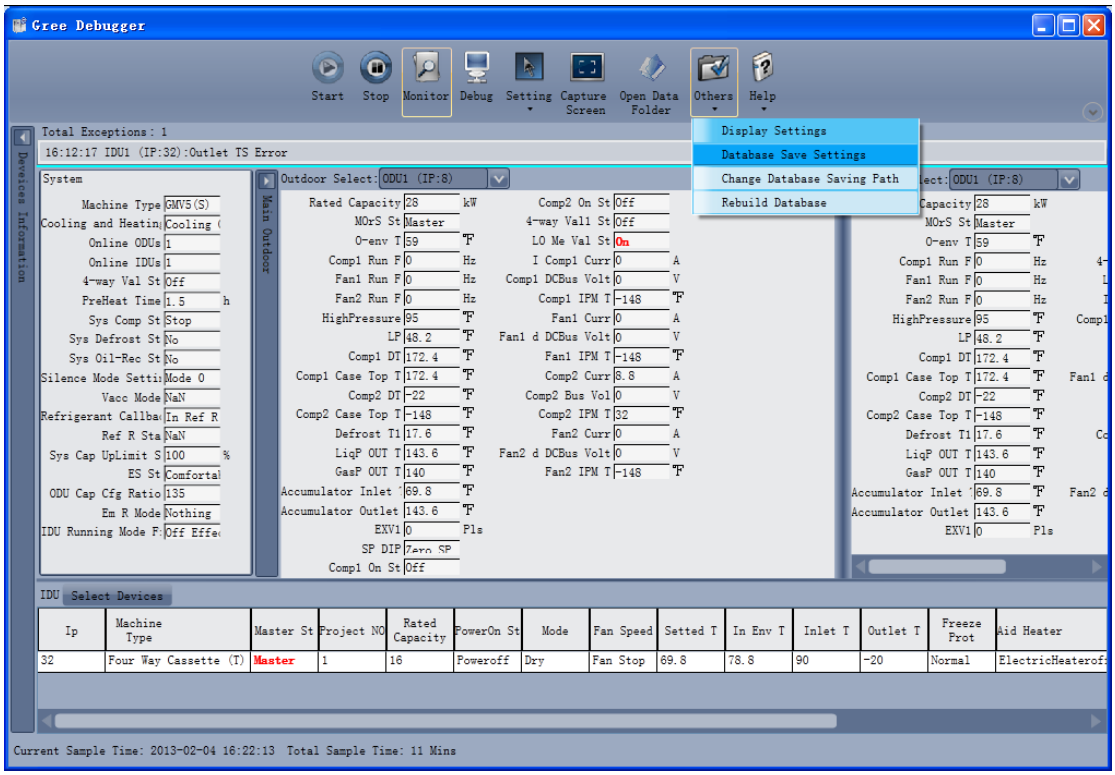
(3) Click icon of “Others” on the menu bar and then click “Display Settings” to select “High Low Pressure Value” and “Refrigerant Type”. Select “Temperature” and the pressure parameter displayed on the interface will be temperature. Select “Pressure” and the pressure parameter displayed on the pressure interface will be pressure. Refrigerant type will affect the pressure parameter displayed on the interface.

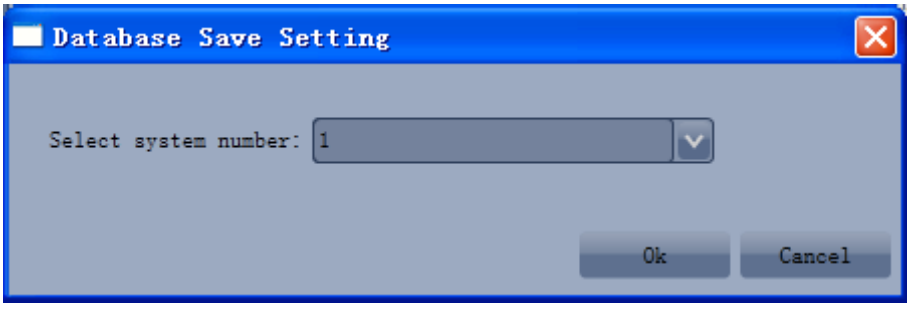




Database saving of multiple systems

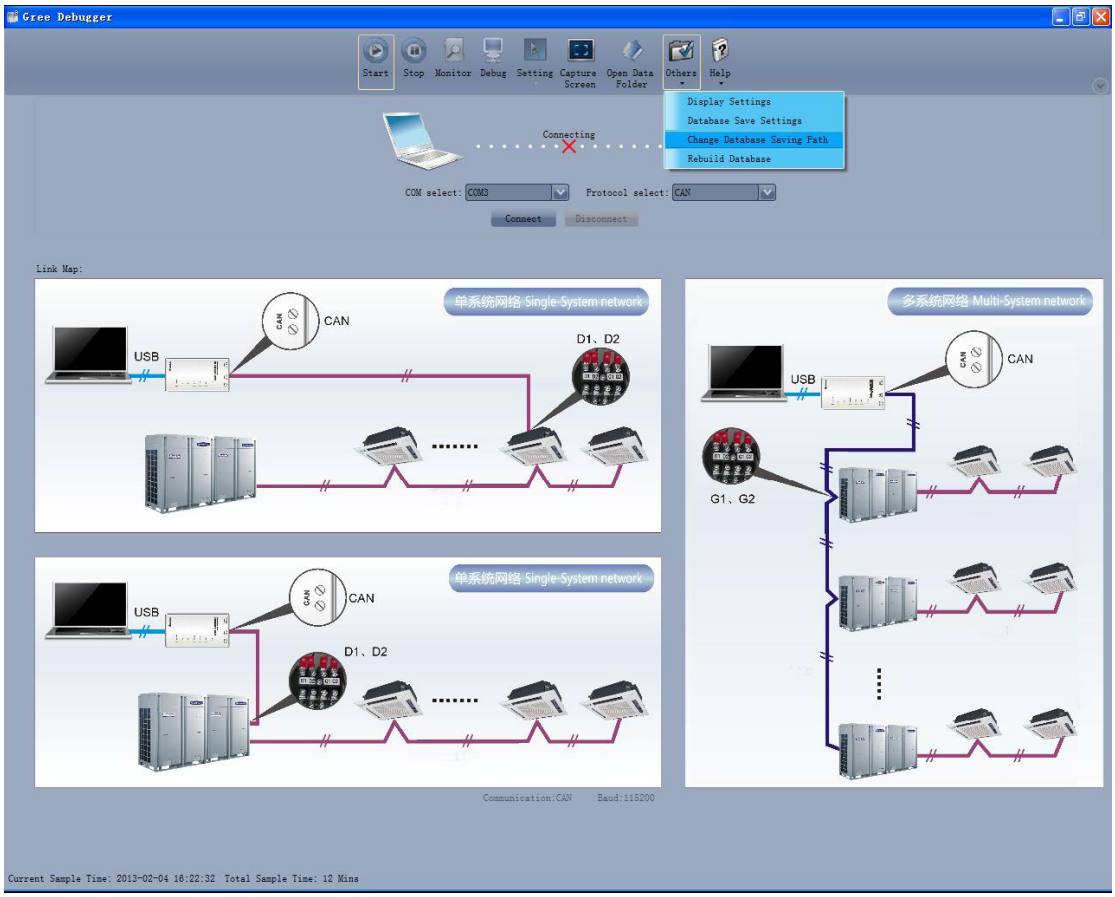
(4) Click icon of “Others” on the menu bar and click “Database Save Settings” to select which system that needs to save database. Because there is a large quantity of data in a network that contains multiple systems, data of only one system can be saved.

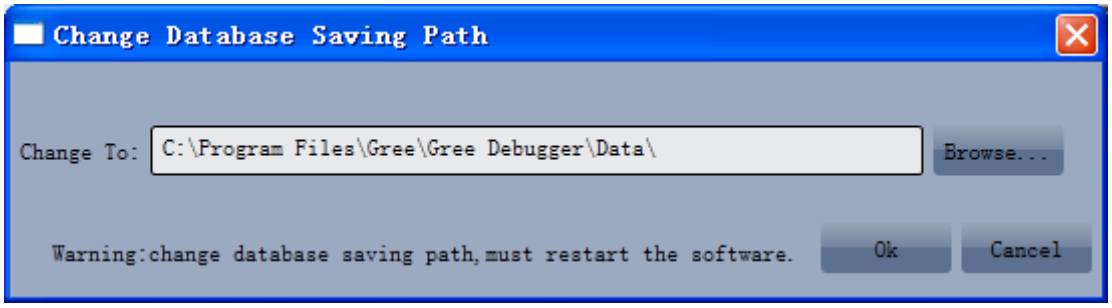


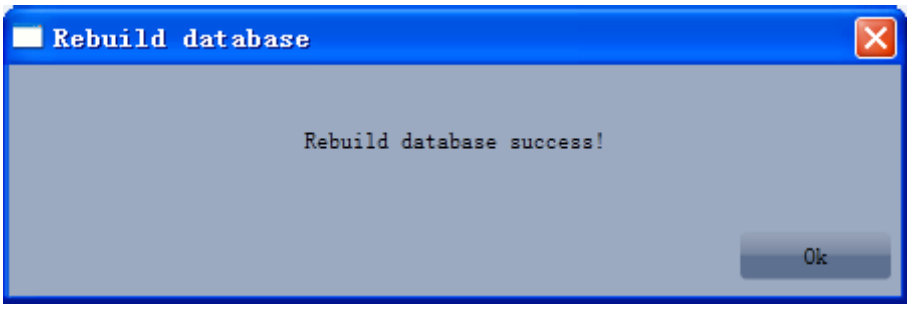


Change database saving path and rebuild database

(5) Change of database saving path and rebuilding of database should be set before the software starts monitoring (see below interface). Click “Change database saving path” and click “Browse” to change the saving path. Click “Rebuild Database” to rebuild the database folder. You can also stop monitoring and turn back to the connection interface to change saving path or rebuild database during monitoring.



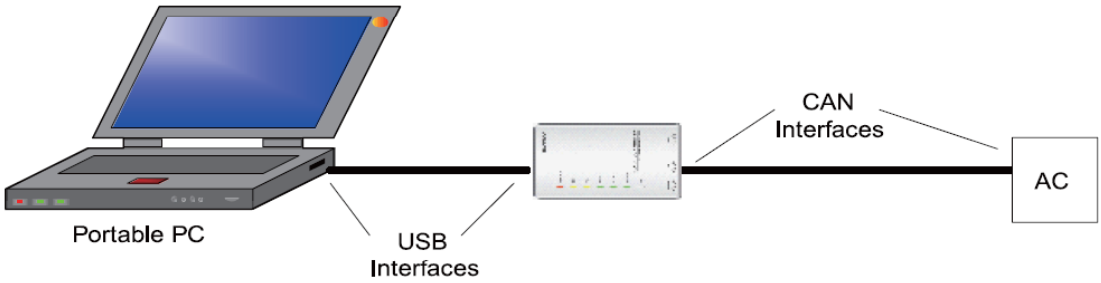




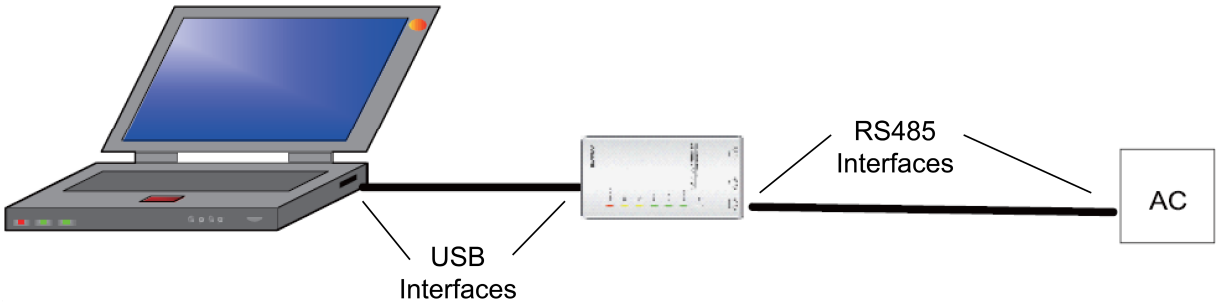
3.4.6 Usage of USB Converter

Usage of converter

(1) Gree commissioning software should be connected with CAN interface when converter is used. For air conditioners with a single system, connect D1 and D2 interfaces of the wiring board. For air conditioners with multiple systems, connect G1 and G2 interfaces of the wiring board.



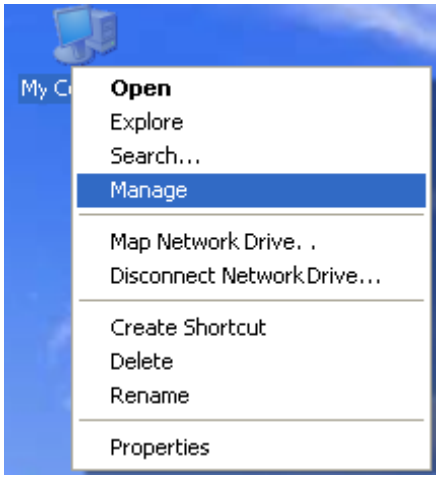
(2) Gree monitoring software should be connected with RS485 interface when converter is used. Connect outdoor or indoor units or the mainboard of wired controller according to actual needs.



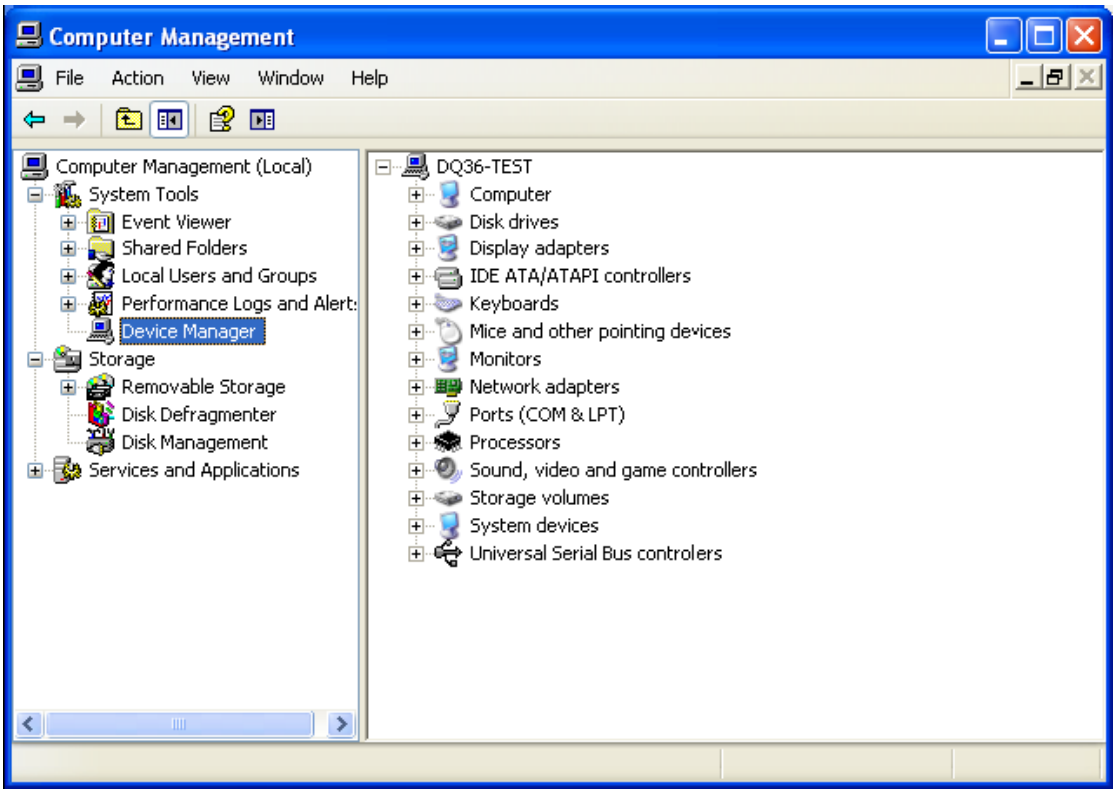
(3) HBS, CAN and RS485 of the converter can be switched by buttons. Press the button “SET” on the converter to realize the conversion among HBS, CAN and RS485 interfaces. You can check the setting through the function LEDs.

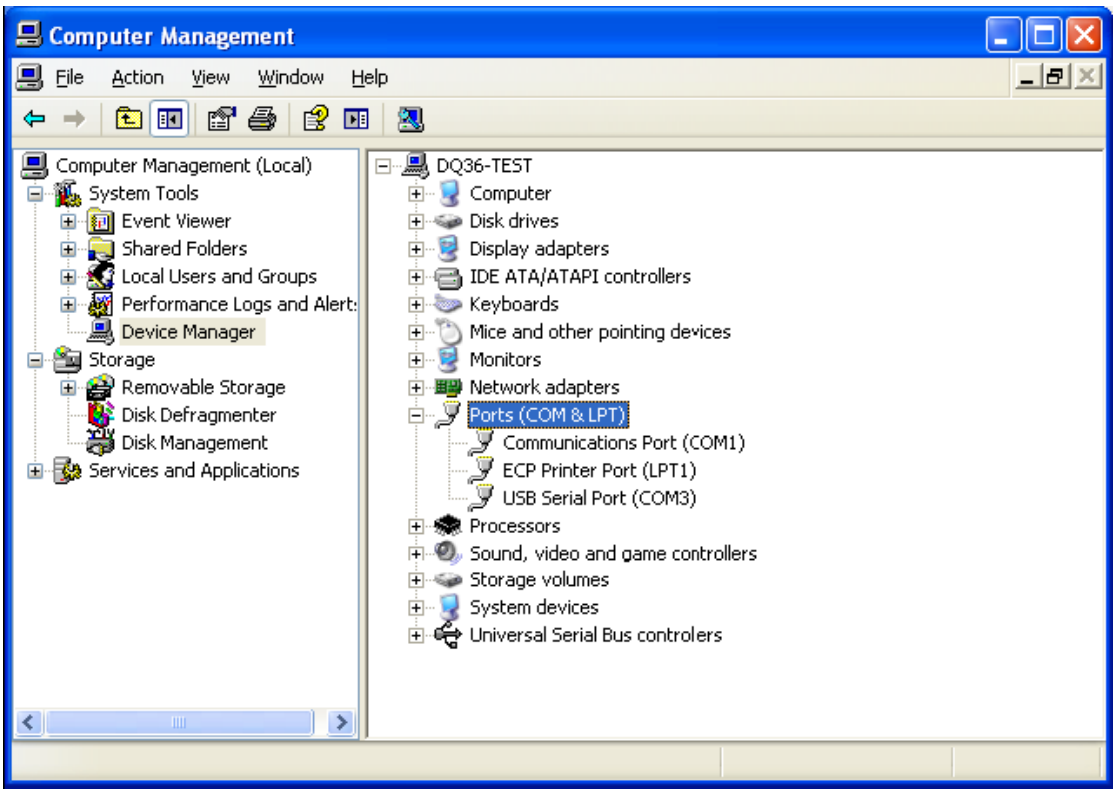
NOTE: If it’s the first time your PC uses Gree USB data converter, in order to prevent Gree USB data converter from being mistaken by your computer as other devices and make sure your mouse can work well, it is necessary to turn off the Serail Enumerator of computer after Gree USB data converter is connected. Below are the steps:

Step 1: Right-click “My Computer” on the desktop and click “Manage”.

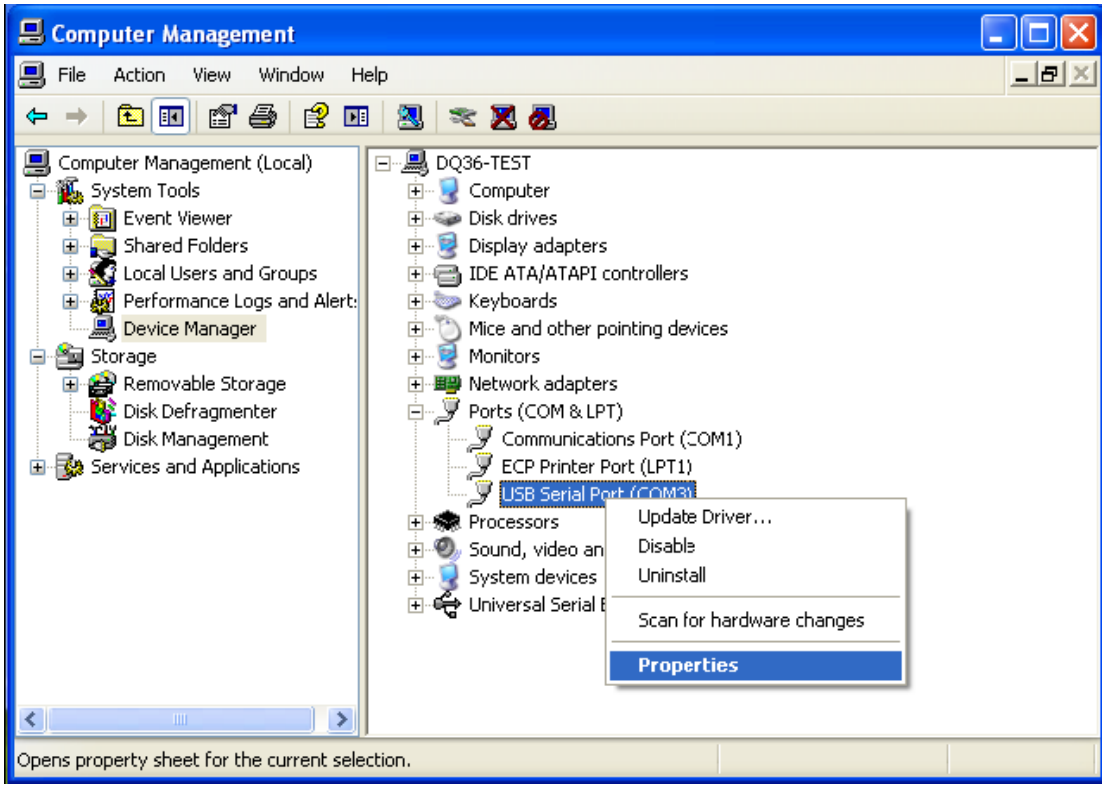


Step 2: In the pop-up window, select “Device Manager” in the left column and then find “Port (COM and LPT)” in the right column. Click its ⊞.

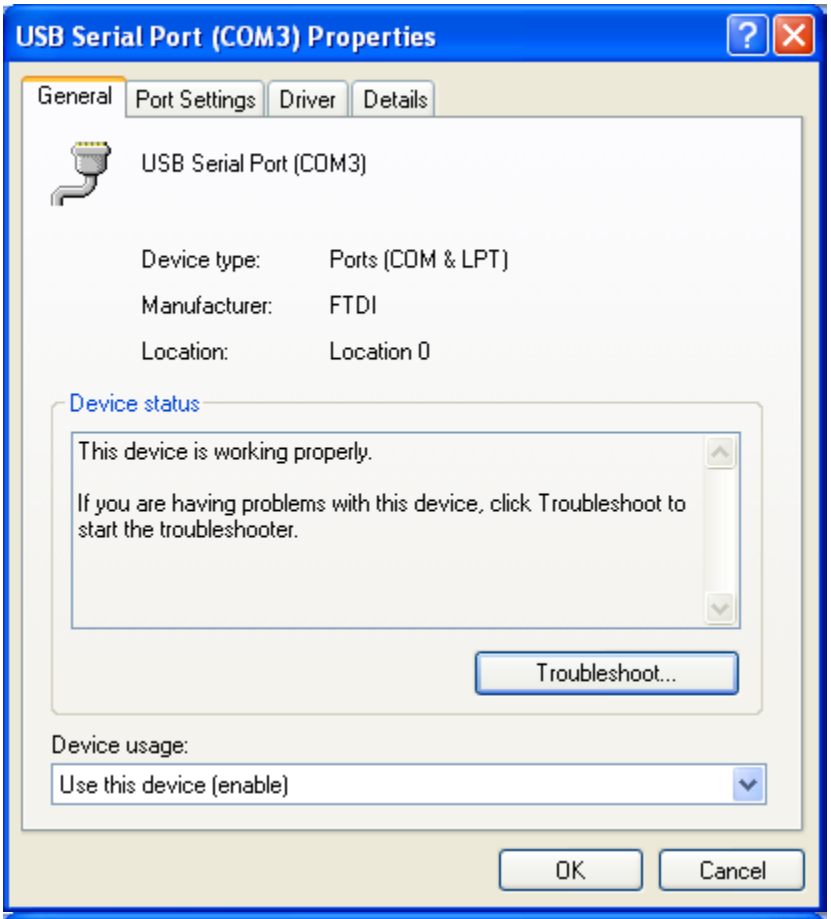


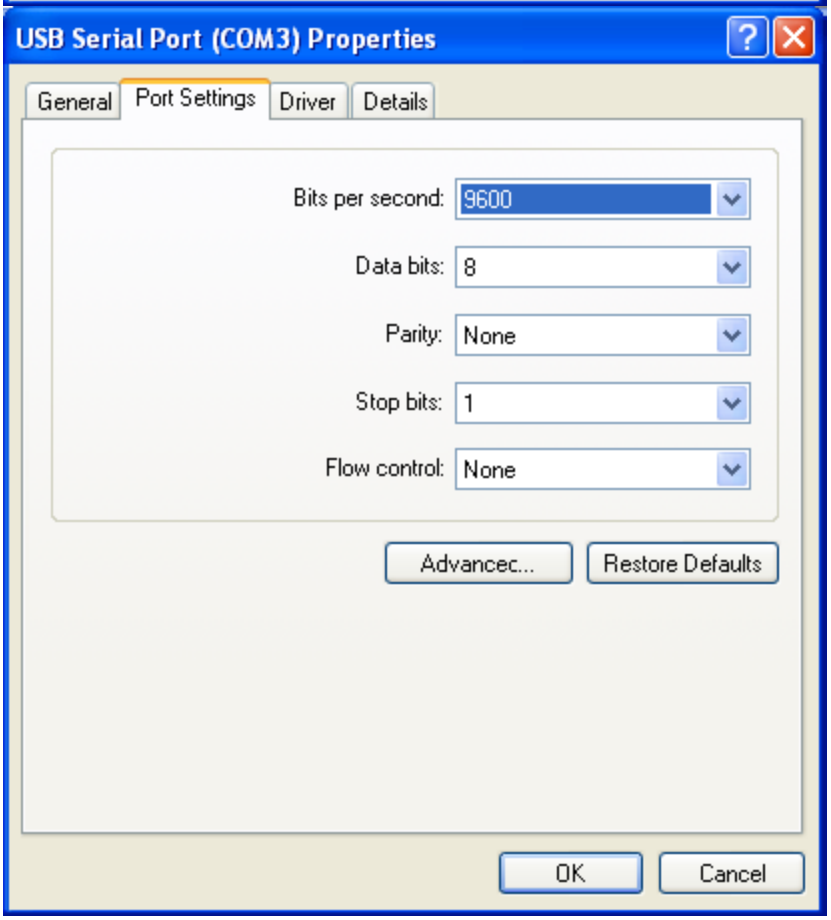


Step 3: “Right-click” USB Serial Port (COM6) and then click “Properties”. The dialog box of properties will then pop up.

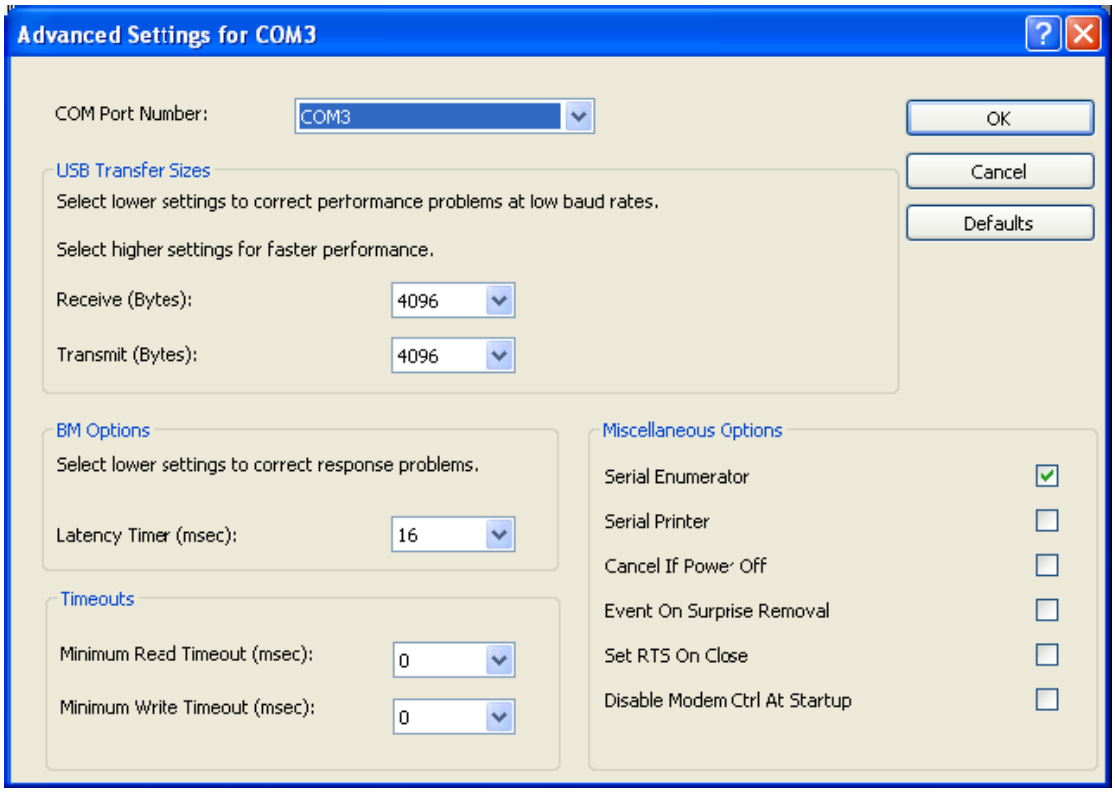


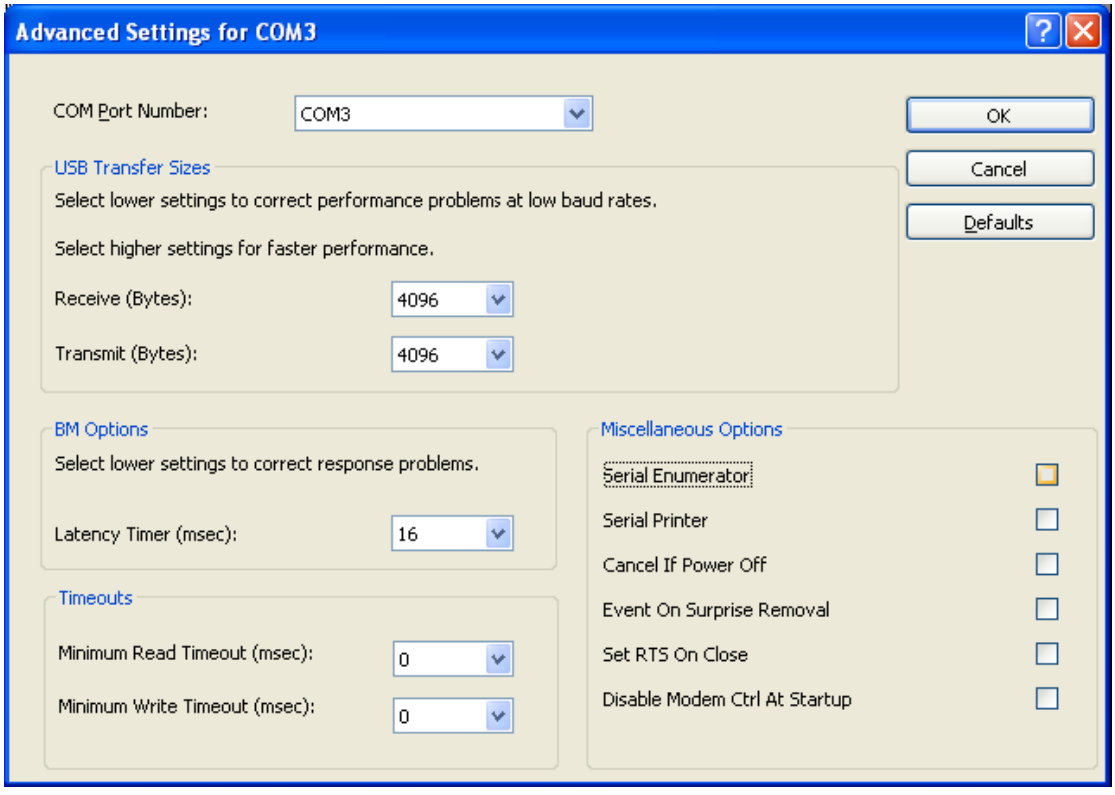
Step 4: Then click “Port Settings” in the dialog box.





Step 5: Click “Advanced” and then a new dialog box will pop up. Find the “Serial Enumerator” in the miscellaneous options and cancel the tick. Click “OK” to exit.





Usage of converter configuring software:

When the converter is working, hold the button “SET” for 5 sec. Function LED will be flickering, indicating that the converter has enter the baud rate setting mode. Then you can use the converter configuring software to set the baud rate of converter. Baud rate supported by the converter (baud rate of air conditioner’s communication interface matches with the baud rate of USB interface automatically):

Ex-factory defaulted baud rate: (unit: bps)

AC is connected with	Baud rate of air conditioner interface	Baud rate of USB interface
CAN	20000/50000 self-adaptive	115200
HBS	57600	38400
RS485	9600	9600

Baud rate look-up table for RS485 interface (unit: bps)

RS485 interface	4800	9600	19200	38400	57600	115200
USB interface	4800	9600	19200	38400	57600	115200

Baud rate look-up table for HBS interface (unit: bps)

HBS interface	9600	19200	38400	57600
USB interface	4800	9600	19200	38400

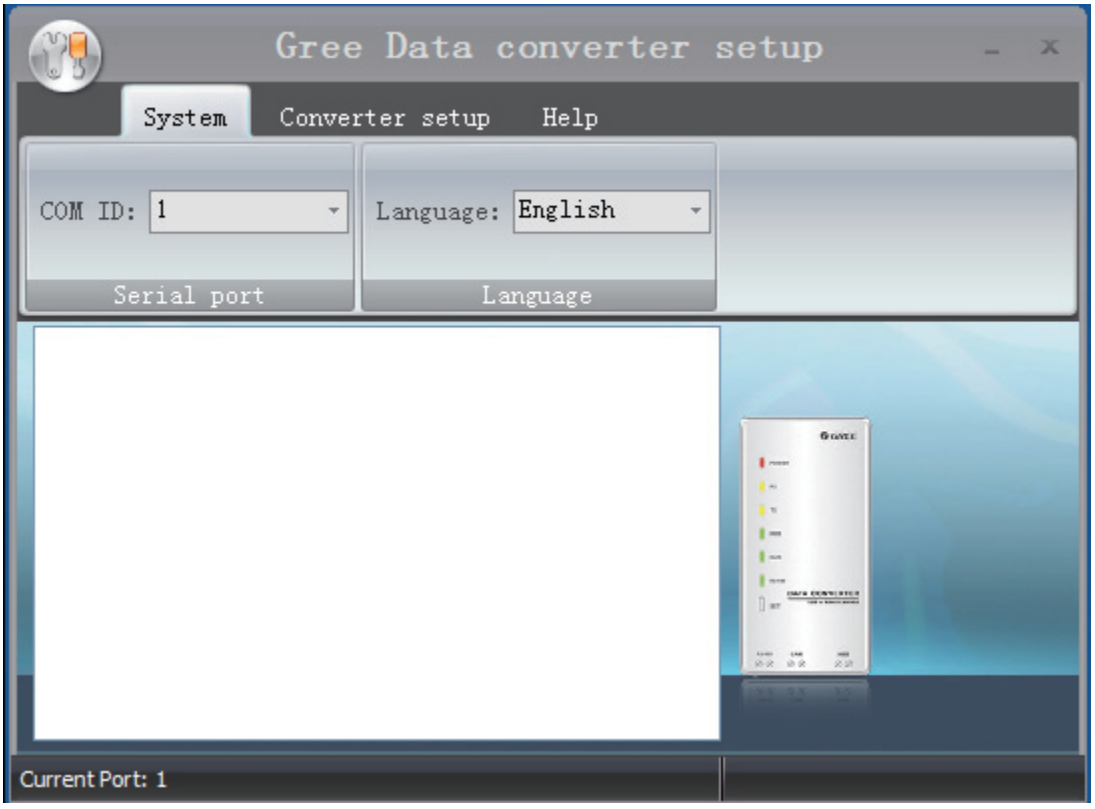
Baud rate look-up table of CAN interface (unit: bps)

CAN interface	20000	50000	100000	125000
USB interface	115200	115200	256000	256000

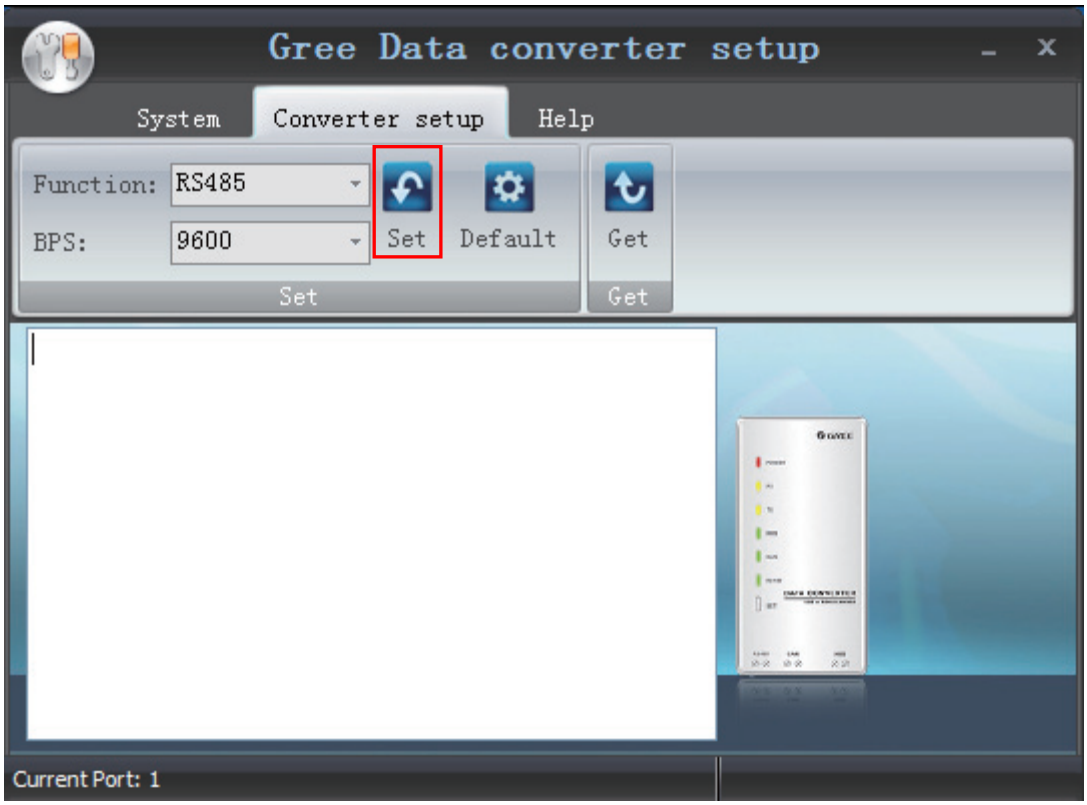
(1) Double-click the desktop shortcut.



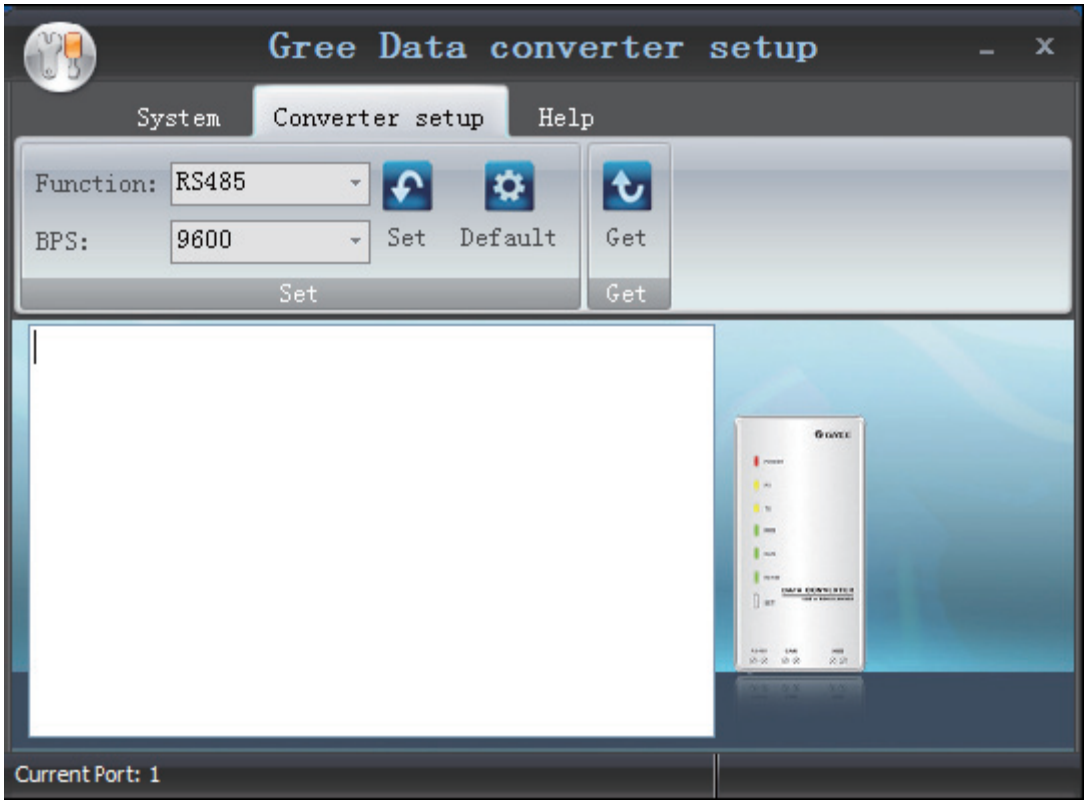
(2) Select the needed communication serial port and language in the “System Settings”.



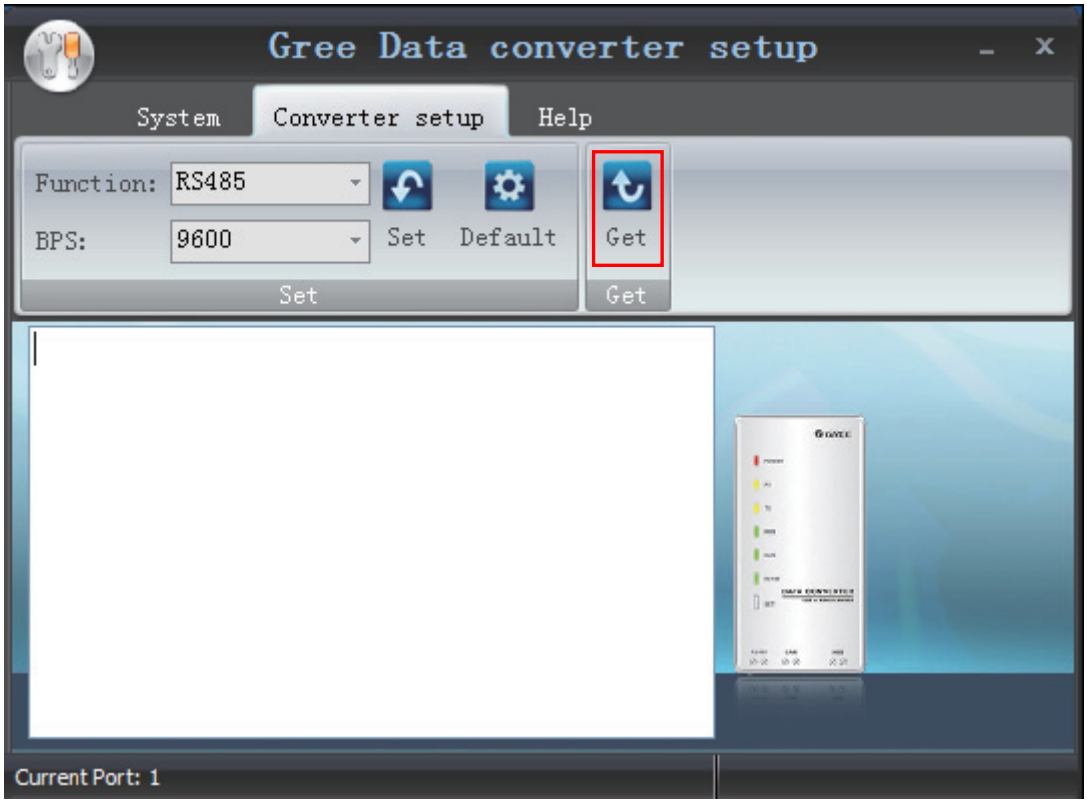
(3) Select the function that is to be set and the corresponding baud rate (refer to the look-up table) in the “Converter Setup”.Then click “Set”.



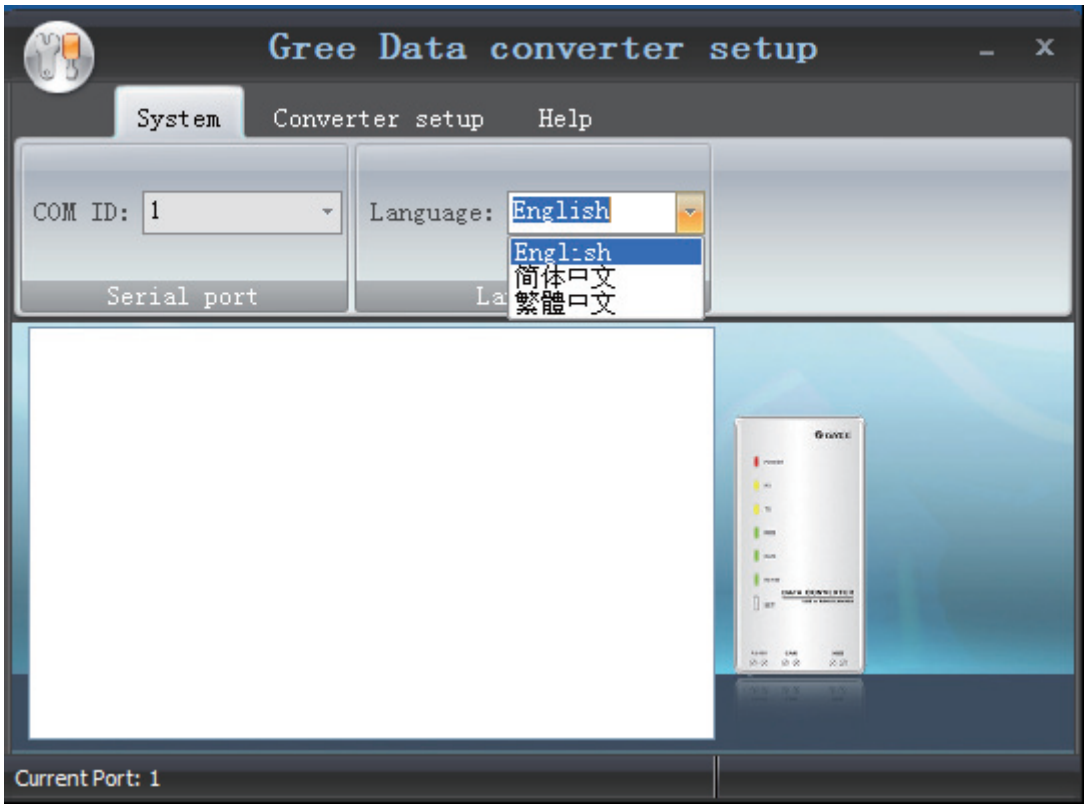
(4) If you want to restore ex-factory settings, click “Default” to restore the default settings.



(5) Click “Get” to get the current setting details of converter.



(6) Switchover of Software Languages.



INSTALLATION

INSTALLATION

1 Engineering Installation Preparation and Notice

1.1 Installation Notice

Personnel and property safety are highly concerned during the entire installation process. Installation implementation must abide by relevant national safety regulations to ensure personnel and property safety.

All personnel involved in the installation must attend safety education courses and pass corresponding safety examinations before installation. Only qualified personnel can attend the installation. Relevant personnel must be held responsible for any violation of the regulation.

1.2 Installation Key Points and Importance

VRF air conditioning systems use refrigerant, instead of other agent, to directly evaporate to carry out the system heat. High level of pipe cleanness and dryness is required in the system. Since various pipes need to be prepared and laid out onsite, carelessness or maloperation during installation may leave impurities, water, or dust inside refrigerant pipes. If the design fails to meet the requirement, various problems may occur in the system or even lead to system breakdown.

Problems that usually occur during installation are as follows:

No.	Installation Problem	Possible Consequence
1	Dust or impurities enter into the refrigeration system.	Pipes are more likely to be blocked; air conditioning performance is reduced; compressor wear is increased or even hinder the normal operation of the system and burn the compressor.
2	Nitrogen is not filled into the refrigerant pipe or insufficient Nitrogen is filled before welding.	Pipes are more likely to be blocked; air conditioning performance is reduced; compressor wear is increased or even hinder the normal operation of the system and burn the compressor.
3	The vacuum degree in the refrigerant pipe is insufficient.	The refrigeration performance is reduced. The system fails to keep normal operation due to frequent protection measures. When the problem getting serious, compressor and other major components can be damaged.
4	Water enters into the refrigeration system.	Copper plating may appear on the compressor and reduce the compressor efficiency with abnormal noise generated; failures may occur in the system due to ice plug.
5	The refrigerant pipe specifications do not meet the configuration requirements.	Smaller configuration specifications can increase the system pipe resistance and affect the cooling performance; larger configuration specifications are waste of materials and can also reduce the cooling performance.
6	Refrigerant pipe is blocked.	The cooling performance is reduced; in certain cases, it may cause long-term compressor operating under overheat conditions; the lubricating effect can be affected and the compressor may be burnt if impurities were mixed with the lubricating oil.
7	Refrigerant pipe exceeds the limit.	The loss in pipe is considerable and the unit energy efficiency decreases, which are harmful for long-term running of the system.
8	Incorrect amount of refrigerant is filled.	The system cannot correctly control the flow allocation; the compressor may be operating under over-heating environment or running when the refrigerant flows back to the compressor.
9	The refrigerant pipe leaks.	Insufficient refrigerant circulating in the system decreases the cooling performance of the air conditioner. Long-term operation under such circumstance may cause an overheating compressor or even damage the compressor.
10	Water drainage from the condensate water pipe is not smooth.	Residual water in IDUs can affect the normal operation of the system. The possible water leakage can damage the IDU's decoration.
11	The ratio of slop for condensate water pipe is insufficient or the condensate water pipe is incorrectly connected.	Reverse slop or inconsistent connection of condensate water pipe can hinder the smooth drainage and cause leakage of the IDU.
12	The air channel is improperly fixed.	The air channel will deform; vibration and noise occur during unit operating.

No.	Installation Problem	Possible Consequence
13	The guide vane of air channel is not reasonably manufactured.	Uneven air quantity allocation reduces the overall performance of the air conditioner.
14	The refrigerant pipe or condensate water pipe does not meet the insulation requirement.	Water can easily condensate and drip to damage the indoor decoration, or even trigger the protection mode of system due to overheating operation.
15	The installation space for IDU is insufficient.	Since there is a lack of space for maintenance and checking, indoor decoration might need to be damaged during such operation.
16	The IDU or the location of the air outlet or return air inlet is not designed reasonably.	The air outlet or return air inlet may be short-circuited, thus affecting the air conditioning performance.
17	The ODU is improperly installed.	The ODU is difficult to be maintained; unit exhaust is not smooth, which reduces the heat exchanging performance or even prevent the system from normal operation; in addition, the cold and hot air for heat exchange and the noise may annoy people in surrounding areas.
18	Power cables are incorrectly provided.	Unit components may be damaged and potential safety hazard may occur.
19	Control communication cables are incorrectly provided or improperly connected.	The normal communication in the system fails or the control over IDUs and ODUs turn in a mess.
20	Control communication cables are not properly protected.	The communication cables are short-circuited or disconnected, and the unit cannot be started up due to communication failure.

Understand the special requirement (if any) for unit installation before implementation to ensure installation quality. Relevant installers must have corresponding engineering construction qualifications.

Special type operators involved in the engineering implementation, such as welders, electricians, and refrigeration mechanics must have relevant operating licenses and are accredited with vocational qualification certification.

2 Installation Materials Selection

The materials, equipment and instruments used during air conditioning engineering construction must have certifications and test reports. Products with fireproof requirements must be provided with fireproof inspection certificates and must meet national and relevant compulsory standards. If environmentally-friendly materials are to be used as required by customers, all such materials must meet national environmental protection requirement and be provided with relevant certificates.

2.1 Refrigerant Piping

(1) Material requirement: Dephosphorization drawing copper pipe for air conditioners;

(2) Appearance requirement: The inner and outer surface of pipe should be smooth without pinhole, crack, peeling, blister, inclusion, copper powder, carbon deposition, rust, dirt or severe oxide film, and without obvious scratch, pit, spot and other defects.

(3) Test report: Certifications and quality test reports must be provided.

(4) The tensile strength must be at least 240 kgf/mm².

(5) Specifications requirement.

R32 Refrigerant System		
OD (mm/inch)	Wall Thickness (mm)	Model
Φ6.35(1/4)	≥0.8	0
Φ9.52(3/8)	≥0.8	0
Φ12.7(1/2)	≥0.8	0
Φ15.9(5/8)	≥1.0	0
Φ19.05(3/4)	≥1.0	0

(6) After the inner part of the copper pipe is cleaned and dried, the inlet and outlet must be sealed tightly by using pipe caps, plugs or adhesive tapes.

2.2 Condensate Water Pipe

(1) Pipes that can be used for air conditioner drainage include: water supplying UPVC pipe, PP-R pipe, PP-C pipe, and HDG steel pipe;

(2) All relevant certificates and quality test reports are provided.

(3) Requirements for specifications and wall thickness

Water supplying UPVC pipe: Φ32mm×2mm, Φ40mm×2mm, Φ50mm×2.5mm.

HDG steel pipe: Φ25mm×3.25mm, Φ32mm×3.25mm, Φ40mm×3.5mm, Φ50mm×3.5mm.

2.3 Insulation Material

(1) Rubber foam insulation material;

(2) Flame retardancy level: B1 or higher;

(3) Refractoriness: at least 120°C;

(4) The insulation thickness of condensate water pipe: at least 10 mm;

(5) When the diameter of copper pipe is equal to or greater than Φ15.9 mm, the thickness of insulation material should be at least 20 mm; when the diameter of copper pipe is less than 15.9 mm, the thickness of insulation material should be at least 15 mm.

2.4 Communication Cable and Control Cable

NOTE: For air conditioning units installed in places with strong electromagnetic interference, shielded wire must be used as the communication cables of the IDU and wired controller, and shielded twisted pairs must be used as the communication cables between IDUs and between the IDU and ODU.

Communication cable selection for ODU and IDUs

Wire type	Total length of communication wire between indoor unit and indoor unit(outdoor unit) (m)	Wire diameter (mm^2)	Wire standard	Remark
Light / ordinary PVC sheathed twisted copper core cord	L≤1000	≥2×0.75	IEC 60227-5:2007	1. If the wire diameter is enlarged to 2×1mm^2, the total communication length line can reach 1500m. The average length of communication line between units is 12.5 m. 2. The cord shall be Circular cord (the cores shall be twisted together). 3. If unit is installed in places with intense magnetic field or strong interference, it is necessary to use shielded wire.

Communication cable selection for IDU and wired controller

Wire type	Total length of communication wire between indoor unit and wired controller (m)	Wire diameter (mm^2)	Wire standard	Remark
Light / ordinary PVC sheathed twisted copper core cord	L≤250	2×0.75 ~2×1.25	IEC 60227-5:2007	1. Total length of communication line can't exceed 250m. The average length of the communication line between indoor unit and wired controller is 15m. The total length of communication wire for different wired controller should refer to the wired controller manual. 2. The cord shall be Circular cord (the cores shall be twisted together). 3. If unit is installed in places with intense magnetic field or strong interference, it is necessary to use shielded wire.

2.5 Power Cable

Only copper conductors can be used as power cables. The copper conductors must meet relevant national standard and satisfy the carrying capacity of unit.

2.6 Hanger Rod and Support

(1) Hanger rod: M8 or M10;

(2) U-steel: 14# or above;

(3) Angle steel: 30mm×30mm×3mm or above;

(4) Round steel: Φ10mm or above.

3 Installation of Outdoor Unit

3.1 Check Before Installation

(1) Before installation, please check the power cord if it complies with the power supply requirement on the nameplate. Make sure the power supply is safe.

(2) This air conditioner must be properly grounded through the receptacle to avoid electric shock. The ground wire shouldn’t be connected with gas pipe, water pipe, lightning arrester or telephone line.

(3) Maintain good air circulation to avoid lacking oxygen.

(4) Read this manual carefully before installation.

3.2 Selection of Installation Site

(1) Select a location which is strong enough to hold unit’s weight so that unit can stand still and erect.

(2) Make sure the unit is not exposed to sun and rain. And the location can resist dust, typhoon and earthquake.

(3) Please keep the unit away from inflammable, explosive and corrosive gas or waste gas.
(4) Make sure the location has space for heat exchange and maintenance so that unit can operate reliably with good ventilation.
(5) ODU and IDU should stay as close as possible to shorten the length of refrigerant pipe and reduce bend angles.
(6) Select a location which is out of children's reach. Keep the unit away from children.

3.3 Carrying and Installing Outdoor Unit

When carrying the outdoor unit, hang the unit in four directions with two sufficient ropes. In order to avoid excursion from the center, the angel of ropes must be smaller than 40º during hanging and moving.

3.4 Installation Notices

In order to ensure proper operation, the selection of installation site must conform to the following principle:

(1) The discharged air of outdoor unit will not flow back and there is sufficient space around the unit for maintenance;
(2) The installation site must be well ventilated to ensure sufficient air intake and discharge. Make sure there is no obstacle at the air inlet and air outlet. If there is any obstacle, please remove it;
(3) The installation site shall be able to withstand the weight of outdoor unit and capable for soundproof and vibration. The air outlet and noise of unit will not affect neighbors;
(4) The hanging of outdoor unit must use appointed hanging hole. Pay attention to protect the unit during hanging and installation. Prohibit hitting the sheet metal to avoid rust in the future.
(5) Avoid direct sunlight;
(6) The rain and condensation water can be drained out smoothly;
(7) The outdoor unit will not be embedded by the snow and not affected by garbage and oil smog;
(8) The installation of outdoor unit shall adopt rubber damping pad or spring damper to reduce noise and vibration;
(9) The installation dimension shall accord with the installation requirement of this manual and the outdoor unit must be fixed at the installation site;
(10) The installation shall be done by professional technicians.

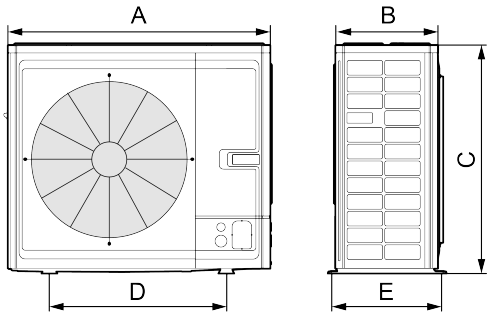
3.5 Fixing and Damping of Unit

The outdoor unit shall be fixed with 4 M12 bolts and closely contacted with the foundation. Otherwise, big vibration and noise will be caused.

The outdoor unit shall be fixed firmly. The rubber board with thickness over 20mm or corrugated rubber damping pad shall be applied between the unit and foundation.

3.6 Outline Dimension and Position of Installation Hole

When carrying the outdoor unit, hang the unit in four directions with two sufficient ropes. In order to avoid excursion from the center, the angel of ropes must be smaller than 40º during hanging and moving.



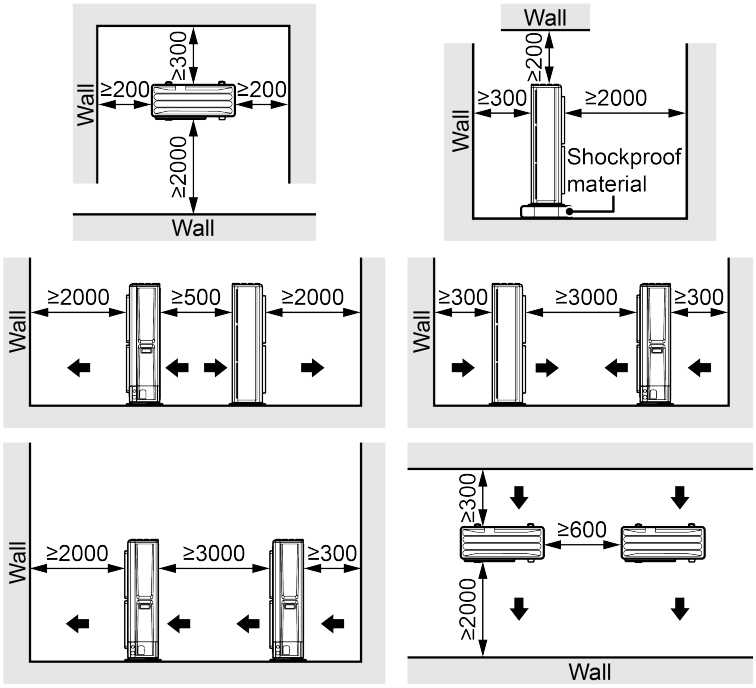
Unit: mm

Model	A	B	C	D	E
GMV-S80WL/NhD-S GMV-S100WL/NhD-S GMV-S121WL/NhD-S GMV-S141WL/NhD-S GMV-S160WL/NhD-S	990	370	955	755	395

3.7 Installation Space Requirement

If the ODU is totally surrounded by walls, please refer to the following figures for space dimension:

Unit: mm



DEBUGGING & MAINTENANCE

DEBUGGING &MAINTENANCE

1 Debugging of Unit

Caution:

(1) After the initial installation is finished and the main board of outdoor unit is replaced, it must perform debugging. Otherwise, the unit can't operate.

(2) The debugging must be performed by professional person or under the the guide of professional person.

1.1 Preparation for Debugging

(1) Do not disconnect the power before the installation is finished,

(2) All wires for controller and electric wires must be connected correctly and reliably.

(3) Check the the fixing ring of the foot of compressor for transportaion is removed.

(4) Remove all sundries from the unit, such as metal chips, joint, forceps holder, and so on.

(5) Check whether the appearance and pipeline system are damaged during carry or transportation process.

(6) Calculate the required added refrigerant-charging volume according to the length of pipe of system and pre-charge the refrigerant. If refrigerant can't be added any more when the required refrigerant-charging volume hasn't been reached, record to refrigerant volume which still needs to be added and continue to add refrigerant during run test operation process. Please refer to below run test for the refrigerant-adding stage during run test process.

(7) After adding refrigerant, please make sure the valve for outdoor is opened completely.

(8) For the convenient of troubleshooting, the unit can't be connected to the PC which installed with related debugging software and make sure that the the datas in real time of this unit can be inspected by this computer. Please refer to Service Manual for the installation and connection of the bebugging software.

(9) Before turn test, please do make sure that the preheat time for compressor is 8h above and touch the compressor to see whether preheat is normal. You can perform run test only after normal preheat. Otherwise, it may damage the compressor.

1.2 Debugging of Unit

Debugging procedure for test run, display instruction for indicator on main board of outdoor unit and operation method are as below:

GMV-S80WL/NhD-S, GMV-S100WL/NhD-S, GMV-S121WL/NhD-S, GMV-S141WL/NhD-S, GMV-S160WL/NhD-S

Description of each stage of debugging progress			
—	Debugging code		Code meaning and operation method
Progress	LED		
	Code	Display status	
01_ Setting of master control unit	A0	ON	The unit is in debugging standby status. Press and hold the button SW3 for over 5s, and it will automatically start debugging.
	01	ON	The master outdoor unit is automatically set by the system. 2s later, the next step “Address allocation” starts.
02_ Address allocation	02/Ad	Display circularly	The system is allocating addresses. 10s later, it will display as below.
	02/oC	Display circularly	Address allocation is done. 2s later, the next step starts.
03_ ODU quantity confirmation	03/01	Display circularly	The system is confirming. 2s later, the next step starts.
04_ Quantity confirmation	04/00~n	Display circularly	“00~n” displays the quantity of indoor units identified by the system. The displayed quantity may be different from the actual quantity. Please check personally. If the actual quantity is different from the displayed one, power off the indoor and outdoor units, and check if the connection of IDU communication lines is faulted. After checking, connect power and start debugging from step 01. If the displayed quantity is correct, press the button SW3 on the main board in 30s to confirm it; if it is not confirmed within 30s, the system will automatically enter the next step. After confirmation, it will display as below.
	04/oC	Display circularly	The quantity of indoor units has been confirmed. 2s later, the next step starts.
05_ Detection of ODU internal communication and capacity ratio	05/C2 05/C3	Display circularly	The main control of the outdoor unit cannot communicate normally with the drive. Please check whether the communication line connection between the outdoor unit main board and the drive board is normal, and proceed to the next step after troubleshooting. If the outdoor unit needs to be powered off during the troubleshooting process, restart debugging from step 01 after the unit is powered on.
	05/oC	Display circularly	The main control of the outdoor unit can communicate normally with the drive. Then the system will detect the capacity ratio of indoor and outdoor units. If the ratio is within range, the system will automatically enter the next step after 2s; if the capacity ratio is out of range, it will display as below.
	05/CH	Display circularly	The rated capacity ratio of indoor units is too high. Change the combination of indoor and outdoor units to make the capacity ratio within a reasonable range, and restart debugging from step 01.
	05/CL	Display circularly	The rated capacity ratio of indoor units is too low. Change the combination of indoor and outdoor units to make the capacity ratio within a reasonable range, and restart debugging from step 01.

Description of each stage of debugging progress			
—	Debugging code		Code meaning and operation method
Progress	LED		
	Code	Display status	
06_ Detection of ODU components	06/ Corresponding error code	Display circularly	Outdoor unit components are faulted. The corresponding error code flashes, except "06". After errors are eliminated, it will automatically enter the next step. If the outdoor unit needs to be powered off during the troubleshooting process, restart debugging from step 01 after the unit is powered on.
	06/oC	Display circularly	The system detects no error on outdoor unit components. 10s later, the next step starts.
07_ Detection of IDU components	07/XX/ Corresponding error code	Display circularly	The system detects errors on indoor unit components. XX represents the project code of the faulty indoor unit. For example, when indoor unit No.01 has errors d5 and d6 and indoor unit No.03 has errors d6 and d7, the nixie tube circularly displays "07", "01", "d5", "d6", "03", "d6", "d7". After errors are eliminated, it will automatically enter the next step. If the outdoor unit needs to be powered off during the troubleshooting process, restart debugging from step 01 after the unit is powered on.
	07/XXXX/ Corresponding error code	Display circularly	If errors occur to an indoor unit whose project code has 3 or more digits, the upper two digits of the project code will be displayed first, then the lower two digits and finally the error code. For example: If indoor unit No.101 has the error L1, the nixie tube will circularly display "01", "01", and "L1". If multiple errors occur to multiple indoor units, the display method is the same.
	07/oC	Display circularly	There is no error on indoor unit components. 5s later, the next step starts.
08_ Compressor preheating confirmation	08/U0	Display circularly	The compressor is not sufficiently preheated. The nixie tube will keep displaying as shown on the left until the preheating time of the compressor reaches 8 hours. Pressing SW3 can skip the waiting time, and the system will enter the next step 2s later (Note: If the compressor is started when the preheating time is less than 8 hours, there is a risk of damage to the compressor, please be careful).
	08/oC	Display circularly	If the outdoor unit has been continuously connected to power for a period of ≥8h, or the last time when the unit was continuously connected to power for a period of ≥8h is within 2 hours from the current time (a clock chip is required), it means compressor preheating is completed. 2s later, the next step starts.
09_ Refrigerant judgment before startup	09/U4	Display circularly	Refrigerant in the system is insufficient. In this case, startup is prohibited and buttons are all invalid. Please power off the indoor and outdoor units, and check whether there is leakage in the pipeline. After fixing the leakage problem, recharge the refrigerant as per the required amount. After recharging, re-energize the unit and start debugging again from step 01 (Note: The unit must be powered off before refrigerant charging. This is to prevent the unit from automatically entering the next step to start running during refrigerant charging).
	09/oC	Display circularly	The amount of refrigerant in the system is normal. 2s later, the next step starts.

Description of each stage of debugging progress			
—	Debugging code		Code meaning and operation method
Progress	LED		
	Code	Display status	
10_ Pre-start ODU valve status judgment	10/on	Display circularly	The outdoor unit valve is being judged during operation. At this time, the compressor starts and runs for about 2 minutes before stopping. The opening status of the outdoor unit's large and small valves is judged, and the judgment result is as follows.
	10/U6	Display circularly	The outdoor unit valve is not fully open. Briefly press the SW4 button on the mainboard; the indicator light will display "09/oC". Then check whether the large and small valves of the outdoor unit are fully open. After confirmation, briefly press the SW4 button on the mainboard again. The compressor will start and run for about 2 minutes, then re-evaluate the valve status.
	10/oC	Display circularly	The valve status is normal. After displaying on the left for 2 seconds, it will automatically proceed to the next step of judgment.
12_ Unit Startup and commissioning confirmation	12/AP	Display circularly	Waiting for confirmation of the unit startup and commissioning command. The SW3 button on the mainboard can be briefly pressed within 1 minute to confirm the unit commissioning startup. If the user does not operate within 1 minute, it will be automatically confirmed. After confirmation, the mainboard indicator lights will display as follows.
	12/AE	Display circularly	The unit startup has been confirmed. After displaying for 2 seconds, the system will start debugging operation. If additional refrigerant needs to be added due to engineering requirements and has not been fully added before debugging, the remaining refrigerant can be added through the low-pressure service port during this operation process.
15_ Debugging	15/AC or 15/AH	Display circularly	During the debugging process, if the system has been running for 50 minutes without an error, it is determined that the system is normal. After the whole system is shut down for 5s, it will enter standby mode.
	15/Corresponding error code	Display circularly	An error occurs during debugging.
Debugging completed	oF	ON	The whole unit has finished debugging and the system is in standby mode.

1.3 Parameters Reference Value for The Normal Operation of Unit

No	Debug item		Parameter name	Unit	Reference
1	System parameters	ODU parameters	Outdoor temperature	°C	—
2			Compressor discharge temp	°C	When compressor starts, discharge temp in cool mode is within 70°C~105°C and at least 10°C higher than the high pressure saturation temp. As for temp in heat mode, it is within 65°C~90°C and at least 10°C higher than the high pressure saturation temp.
3			Defrosting temp	°C	In cool mode, defrosting temp is 4°C~10°C lower than system's high pressure value. In heat mode, defrosting temp is about 2°C different from system's low pressure value.
4			System high pressure	°C	In cool mode, the normal high pressure value is within 20°C~55°C. According to the change of ambient temp and system's operating capacity, the high pressure value will be 10°C~30°C higher than ambient temp. The higher ambient temp is, the smaller temp difference is. If ambient temp is 25°C~35°C in cool mode, system's high pressure value will be within 44°C~53°C. In heat mode, if ambient temp is above -5°C, system's high pressure value is within 40°C~52°C. If ambient temp is low and many IDUs are turned on, the high pressure will be lower.
5			System low pressure	°C	When ambient temp in cool mode is 25°C~35°C, the low pressure value is 0°C~8°C. When ambient temp in heat mode is above -5°C, the low pressure value is -15°C~8°C.
6			Opening angle of thermal EXV	PLS	In cool mode, the thermal electronic expansion valve remains 480PLS. In heat mode, the adjustable opening angle of EXV is 50~480PLS.
7			Compressor's operating freq	Hz	Changes in 10Hz~80Hz.
8			Compressor's operating current	A	When compressor works normally, the current is no more than 18.4A.
9			Compressor's IPM temp	°C	When ambient temp is below 35°C, IPM temp is lower than 80°C and the highest temp won't be above 95°C.
10			Fan motor's operating freq	Hz	Changes in 0~49Hz according to system's pressure.
11		IDU parameters	IDU ambient temp	°C	—
12			Indoor heat exchanger's inlet temp	°C	According to ambient temp, for a same IDU in cool mode, the inlet temp will be 1°C~7°C lower than the outlet temp, and 4°C~9°C higher than the low pressure value. For a same IDU in heat mode, the inlet temp will be 10°C~20°C lower than the outlet temp.
13			Indoor heat exchanger's inlet temp	°C	
14			Opening angle of indoor EXV	PLS	In cool mode, the opening angle of indoor EXV varies within 70~480PLS. In heat mode, the opening angle of indoor EXV varies within 120~480PLS.
15	Communication parameters		Communication data	—	Number of IDUs detected by software is the same with the actual number. No communication error.
16	Drainage system		—	—	Indoor unit can drain water out completely and smoothly. Condensate pipe has no backward slope of water; Water of outdoor unit can be drained completely through drainage pipe. No water drop from unit base.
17	Others		—	—	Compressor and indoor/outdoor fan motor do not have strange noise. Unit can operate normally.

2 Malfunction List

2.1 Malfunction List for The Wired Controller

Error Code	Content	Error Code	Content
L0	Malfunction of IDU (uniform)	d1	Indoor PCB is poor
L1	Protection of indoor fan	d2	Malfunction of lower water temperature sensor of water tank
L2	Auxiliary heating protection	d3	Malfunction of ambient temperature sensor
L3	Water-full protection	d4	Malfunction of entry-tube temperature sensor
L4	Abnormal power supply for wired controller	d5	Malfunction of middle temperature sensor
L5	Freeze prevention protection	d6	Malfunction of exit-tube temperature sensor
L6	Mode shock	d7	Malfunction of humidity sensor
L7	No main IDU	d8	Malfunction of water temperature sensor
L8	Power supply is insufficient	d9	Malfunction of jumper cap
L9	For single control over multiple units, number of IDU is inconsistent	dA	Web address of IDU is abnormal
LA	For single control over multiple units, IDU series is inconsistent	dH	PCB of wired controller is abnormal
LH	Alarm due to bad air quality	dC	Abnormal setting for capacity button
LC	IDU is not matching with outdoor unit	dL	Malfunction of air outlet temperature sensor
LL	Malfunction of water flow switch	dE	Malfunction of indoor CO_2 sensor
LE	Rotation speed of EC DC water pump is abnormal	dF	Malfunction of upper water temperature sensor of water tank
LF	Malfunction of shunt valve setting	dJ	Malfunction of backwater temperature sensor
LJ	Setting of functional DIP switch code is wrong	dP	Malfunction of inlet tube temperature sensor of generator
LP	Zero-crossing malfunction of PG motor	dU	Malfunction of drainage pipe temperature sensor of generator
LU	Indoor unit's branch is not inconsistent for one-to-more unit of heat recovery system	db	Debugging status
Lb	Inconsistent IDU of group-controlled reheat and dehumidification system	dd	Malfunction of solar power temperature sensor
y1	Malfunction of inlet tube temperature sensor 2	dn	Malfunction of swing parts
y2	Malfunction of outlet tube temperature sensor 2	dy	Malfunction of water temperature sensor
y7	Malfunction of fresh air intake temperature sensor	y8	Main error of indoor air box sensor
yA	IFD malfunction	yb	Refrigerant Leakage Protection
yd	Malfunction of Refrigerant Detection Sensor	En	Malfunction of System Refrigerant Detection

2.2 Status Display Table for Indicators on Main Board of Outdoor Unit

Display code table of outdoor unit is as below:

Error Code	Content	Error Code	Content
F0	Main board of ODU is poor	E0	Malfunction of ODU (uniform)
F1	Malfunction of high-pressure sensor	E1	High-pressure protection
F3	Malfunction of low-pressure sensor	E2	Discharge low-temperature protection
F5	Malfunction of discharge temperature sensor of compressor 1	E3	Low-pressure protection
F6	Malfunction of exit-tube temperature sensor	E4	High discharge temperature protection of compressor
F7	Malfunction of humidity sensor	Ed	Drive module low temperature protection
F8	Malfunction of water temperature sensor	J0	Protection for other modules
F9	Malfunction of jumper cap	J1	Over-current protection of compressor 1
FA	Web address of IDU is abnormal	J2	Over-current protection of compressor 2
FC	Current sensor of compressor 2 is abnormal	J3	Over-current protection of compressor 3
FL	Current sensor of compressor 3 is abnormal	J4	Over-current protection of compressor 4
FE	Current sensor of compressor 4 is abnormal	J5	Over-current protection of compressor 5
FF	Current sensor of compressor 5 is abnormal	J6	Over-current protection for compressor 6
FJ	Current sensor of compressor 6 is abnormal	J7	Gas-mixing protection of 4-way valve
FP	Malfunction of DC motor	J8	High pressure ratio protection of system
FU	Malfunction of casing top temperature sensor of compressor 1	J9	Low pressure ratio protection of system
Fb	Malfunction of casing top temperature sensor of compressor 2	JA	Protection because of abnormal pressure
Fd	Malfunction of exit tube temperature sensor of mode exchanger	JC	Water flow switch protection
Fn	Malfunction of inlet tube temperature sensor of mode exchanger	JL	Protection because high pressure is too low
b1	Malfunction of outdoor ambient temperature sensor	JE	Oil-return pipe is blocked
b2	Malfunction of defrosting temperature sensor 1	JF	Oil-return pipe is leaking
b3	Malfunction of defrosting temperature sensor 2	P0	malfunction of driving board of compressor (uniform)
b4	Malfunction of liquid temperature sensor of sub-cooler	P1	Driving board of compressor operates abnormally (uniform)
b5	Malfunction of gas temperature sensor of sub-cooler	P2	Voltage protection of driving board power of compressor (uniform)
b6	Malfunction of inlet temp sensor of gas-liquid separator	P3	Reset protection of driving module of compressor
b7	Malfunction of outlet temp sensor of gas-liquid separator	P4	Drive PFC protection of compressor
b8	Malfunction of outdoor humidity sensor	P5	Over-current protection of inverter compressor
b9	Malfunction of gas temperature sensor of heat exchanger	P6	Drive IPM module protection of compressor
bA	Malfunction of oil-return temperature sensor 1	P7	Malfunction of drive temperature sensor of compressor
bH	Clock of system is abnormal	P8	Drive IPM high temperature protection of compressor
bE	Malfunction of inlet tube temperature sensor of condenser	P9	Desynchronizing protection of inverter compressor
bF	Malfunction of outlet tube temperature sensor of condenser	PA	Malfunction of drive storage chip of compressor
bJ	High-pressure sensor and low-pressure sensor are connected reversely	PH	High-voltage protection of compressor's drive DC bus bar
bP	Malfunction of temperature sensor of oil-return 2	PC	Drive current detection circuit malfunction of compressor

Error Code	Content	Error Code	Content
bU	Malfunction of temperature sensor of oil return 3	PL	Low-voltage protection of compressor's drive DC bus bar
bb	Malfunction of temperature sensor of oil return 4	PE	Phase-lacking of inverter compressor
bd	Malfunction of air inlet temperature sensor of subcooler	PF	Drive charging circuit malfunction of compressor
bn	Malfunction of liquid inlet temperature sensor of subcooler	PJ	Failure startup of inverter compressor
H0	Malfunction of driving board of fan (uniform)	PP	AC current protection of inverter compressor
H1	Driving board of fan operates abnormally (uniform)	PU	AC input voltage of drive of inverter compressor
H2	Voltage protection of driving board power of fan (uniform)	Py	DIP switch code or jumper cap of compressor driver is abnormal
H3	Reset protection of driving module of fan	G0	PV reversed connection protection
H4	Drive PFC protection of fan	G1	PV Anti-islanding protection
H5	Over-current protection of inverter fan	G2	PV DC overcurrent protection
H6	Drive IPM module protection of fan	G3	PV power generation overload
H7	Malfunction of drive temperature sensor of fan	G4	PV leakage current protection
H8	Drive IPM high temperature protection of fan	G5	Phase-lacking protection at power grid side
H9	Desynchronizing protection of inverter fan	G6	Phase-lacking protection at power grid side
HA	Malfunction of drive storage chip of inverter outdoor fan	G7	PV LVRT
HH	High-voltage protection of fan's drive DC bus bar	G8	Overcurrent protection at power grid side
HC	Drive current detection circuit malfunction of fan	G9	Drive IPM module protection at power grid side
HL	Low-voltage protection of fan's drive DC bus bar	GA	Low/high input voltage protection at power grid side
HE	Phase-lacking of inverter fan	GH	Photovoltaic DC\DC protection
HF	Drive charging circuit malfunction of fan	GC	Photovoltaic DC hardware overcurrent protection
HJ	Failure startup of inverter fan	GL	Grid side hardware overcurrent protection
HP	AC current protection of inverter fan	GE	High or low photovoltaic voltage protection
HU	AC input voltage of drive of inverter fan	GF	DC bus neutral-point potential unbalance protection
Gd	Grid side current sensor protection	GJ	Grid side module high-temperature protection
Gn	Insulation resistance protection	GP	Grid side temperature sensor protection
Gy	Unrecoverable error of grid drive (photovoltaic)	GU	Charging circuit protection
Gb	Grid side relay protection	—	—

2.3 Function Setting of Outdoor Unit

GMV-S80WL/NhD-S, GMV-S100WL/NhD-S, GMV-S121WL/NhD-S, GMV-S141WL/NhD-S, GMV-S160WL/NhD-S

Before setting every function, perform the following steps to select the function you want to set. The following premise steps will not be repeated.

Premise steps for function setting:

Step 1: Power on the entire system.

Step 2: Press and hold the SW1 up button on the unit for over 5 seconds. The system enters the function setting status. The unit displays as follows by default.

LED	
Function code	Display status
A7	Blinks

Press the SW1 up button and the SW2 down button on the unit to select the corresponding function/parameter:

LED		Function Name
Function code	Display status	
A7	Blinks	Outdoor unit silence
A6	Blinks	Cooling/heating of the entire system
n3	Blinks	Forced defrosting

2.3.1 Outdoor Silence Mode

This function is mainly used in scenarios where the user requires low ambient noise. Smart night silence mode and forced silence mode are available.

In smart night silence mode, need to set timer of outdoor units.

to ensure low-noise operation at night. Smart night silence mode has nine options:

LED	
Function code	Display status
00~12	Blinks

00~12 indicate the corresponding silence modes, which can be selected using the SW1 up select key (▲) and SW2 down select key (▼).

After selecting the corresponding silence mode, press the SW3 confirm button. The outdoor unit displays as follows:

LED	
Function code	Display status
00~12	On

Press the SW4 back button on the master module to return to the previous process or exit the function setting status.

if there is no key operation on the master module for 5 consecutive minutes, the system will automatically exit and the unit will resume displaying the current status.

2.3.2 Cooling/Heating of the Entire System

This function sets the cooling/heating mode of the entire system. Available modes include:

Outdoor Unit Function Mode		Available Indoor Unit Operation Modes
Code	Name	
nA	Cooling and heating	Cooling, dry, heating, and fan (Note: Heating mode cannot run with other modes at the same time.) (Default setting)
nC	Cooling only	Cooling, dry, and fan
nH	Heating only	Heating and fan (Note: Heating mode cannot run with other modes at the same time.)
nF	Fan	Fan

The user or administrator needs to set the mode of the outdoor unit based on the actual usage to avoid conflicts.

Setting steps:

Step 1: Enter A6 cooling/heating setting of the entire system, and ensure that the outdoor unit displays as follows:

LED	
Current process	Display status
nC	Blinks

Step 2: Press the SW1 up button and the SW2 down button to select the corresponding cooling/heating mode.

LED	
Current process/mode	Display status
nC	Blinks
nH	Blinks
nA	Blinks
nF	Blinks

Step 3: After selecting the mode, press the SW3 confirm button. The outdoor unit displays as follows:

LED	
Current process/mode	Display status
nC	On
nH	On
nA	On
nF	On

Press the SW4 back button on the outdoor unit to return to the previous process or exit the function setting status.

The outdoor unit memorizes this setting and does not clear it even upon power failure and power-on again. The default value is nA cooling and heating mode.

2.3.3 Forced Defrosting

This function is used when forced defrosting is required during unit maintenance. After entering forced defrosting, the system automatically exits according to the exit conditions, and then automatically runs according to the system conditions.

Setting steps:

Step 1: Enter n3 forced defrosting, and ensure that the outdoor unit displays as follows:

LED	
Current process/mode	Display status
n3	Blinks

Step 2: Press the SW3 confirm button. The outdoor unit displays as follows:

LED	
Function code	Display status
n3	On

If the defrosting condition is not met, the outdoor unit the set mode. If the setting is completed, press SW4 to resume the unit to the current normal working status.

When the defrosting exit condition is met, the system automatically exits and resumes normal running control.

2.3.4 Restoration to Default Settings

Restoration to default settings 1 (clearing all settings)

On the main board of the master unit, press and hold the SW1 up button and SW4 back button for over 10 seconds to restore the system default settings. The unit display as follows:

LED1	
Status code	Display status
0C	Blinks for 3 seconds

At this time, the system clears all settings, including engineering numbers of the indoor and outdoor units, quantities of the indoor and outdoor units, and commissioning completion status.

Restoration to default settings 2 (clearing all settings except the commissioning status)

On the main board of the master unit, press and hold the SW2 down button and SW4 back button for over 10 seconds to clear all the system settings. The unit display as follows:

LED1	
Status code	Display status
0C	Blinks for 5 seconds

At this time, the system clears all settings, including engineering numbers of the indoor and outdoor units, but stores quantities of the indoor and outdoor units, and commissioning completion status.

Restoration to default settings 3 (clearing only function settings of the outdoor unit)

On the main board of the master unit, press and hold the SW3 back button and SW4 back button for over 10 seconds to clear all the system settings. The unit display as follows:

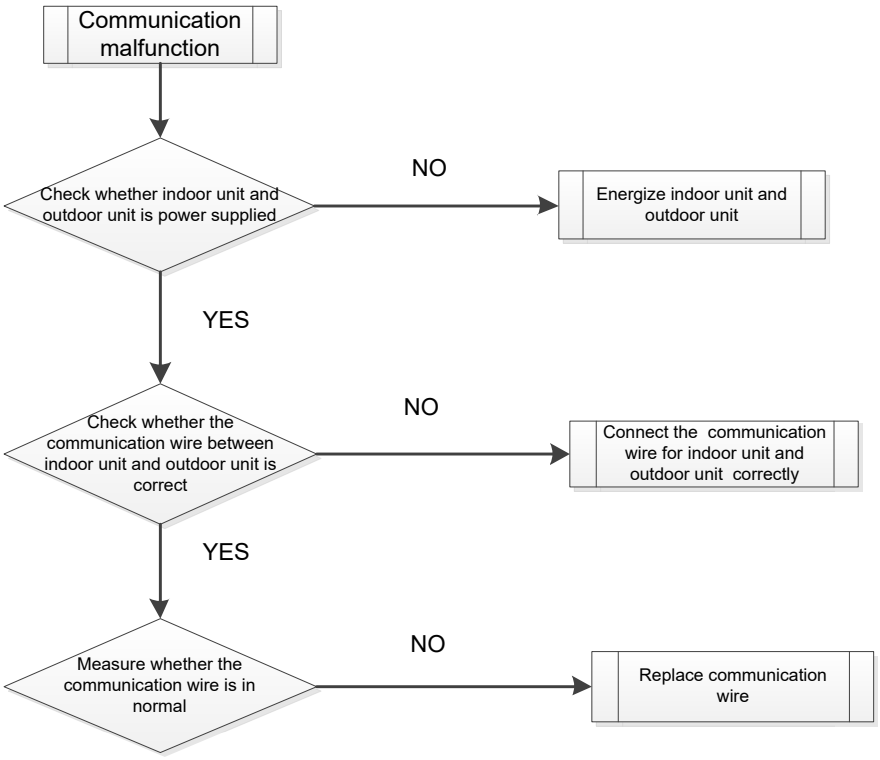
LED1	
Status code	Display status
0C	Blinks for 7 seconds

At this time, the system clears all settings, but stores engineering numbers of the indoor and outdoor units, quantities of the indoor and outdoor units, and commissioning completion status.

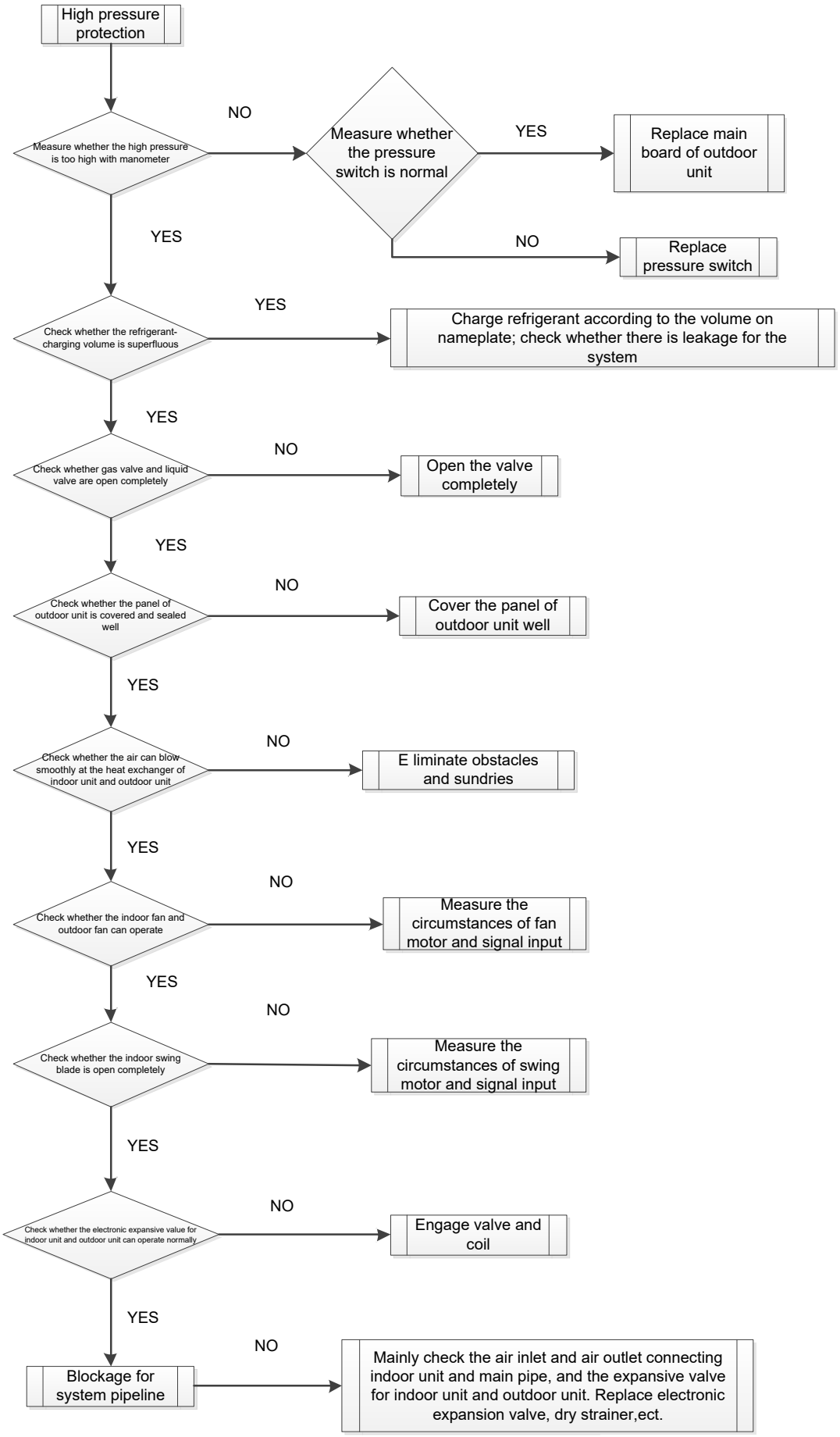
3 Troubleshooting

Troubleshooting principle

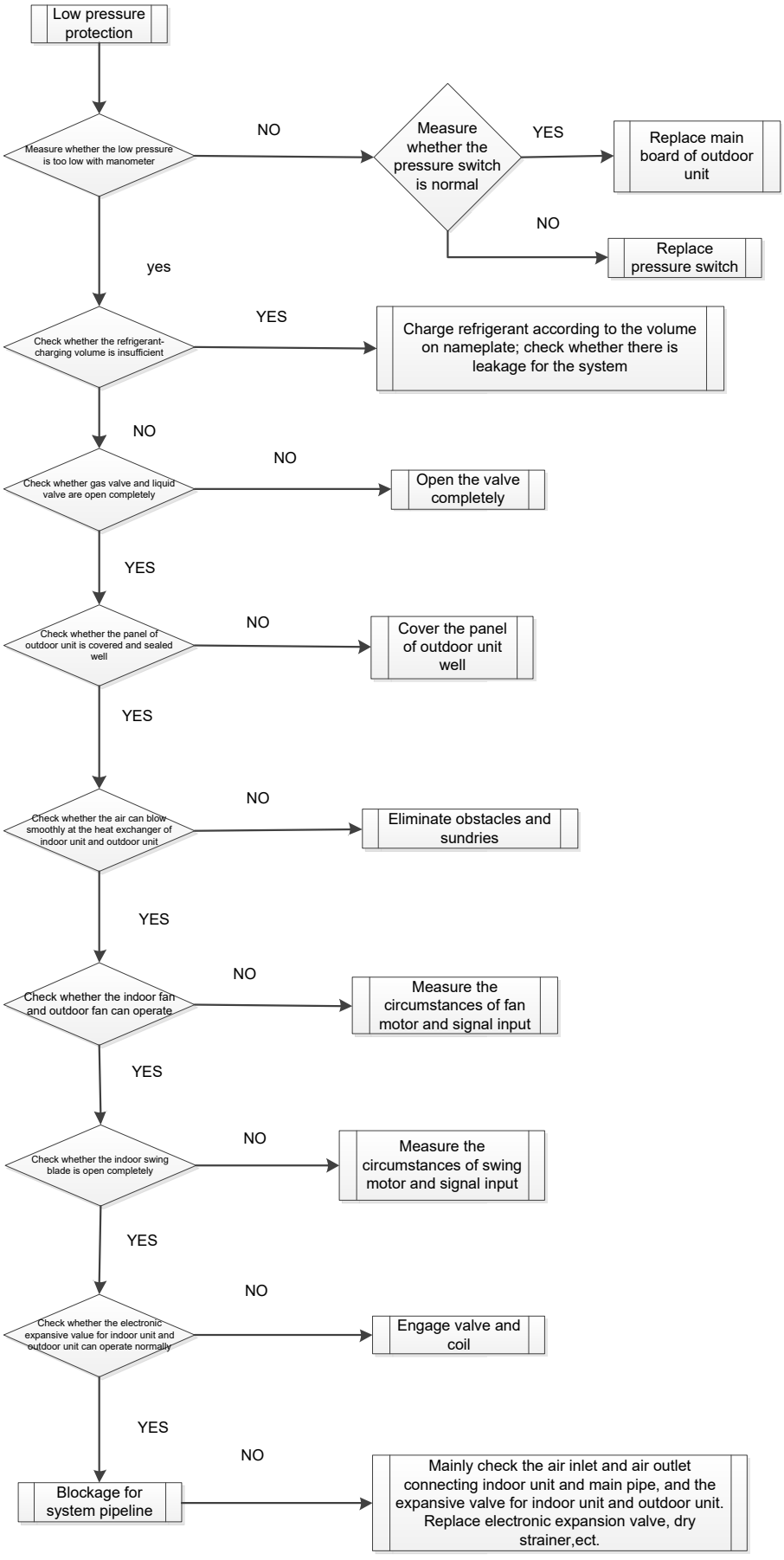
(1) Communication malfunction



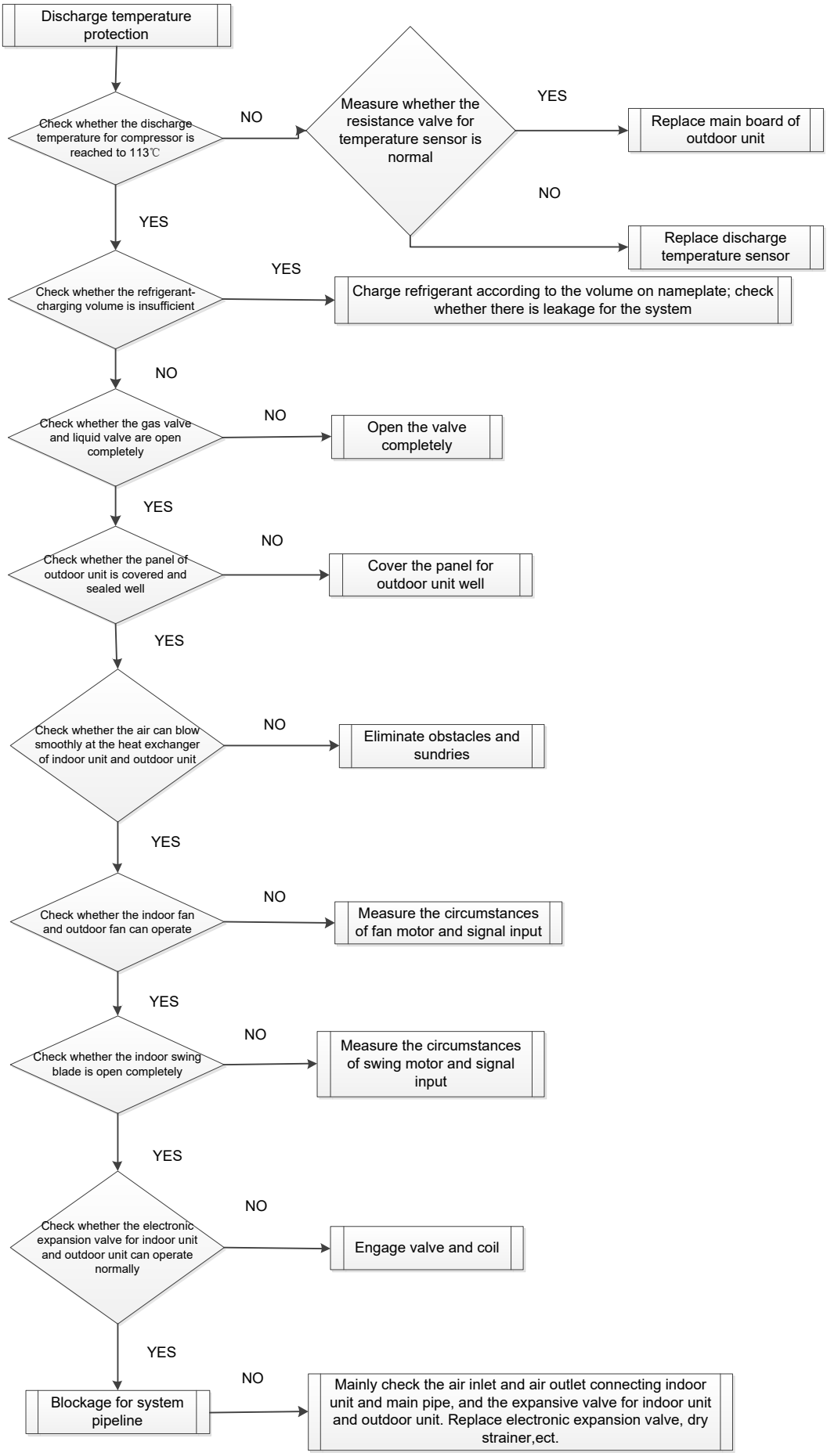
(2) High pressure protection



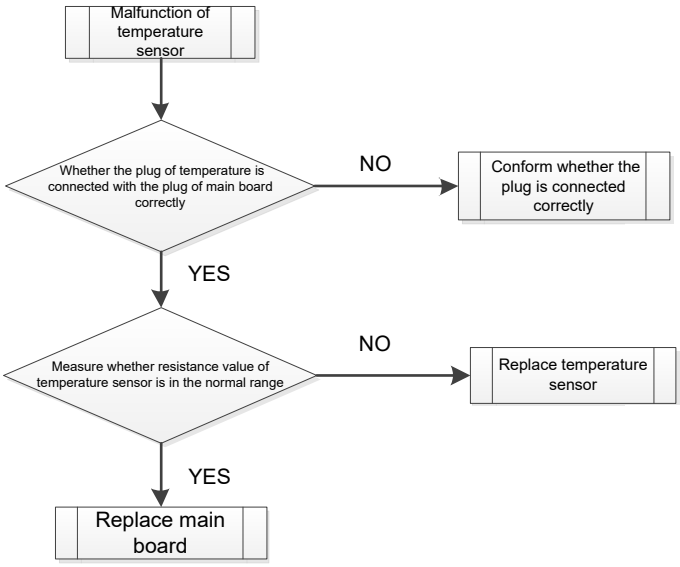
(3) Low-pressure protection



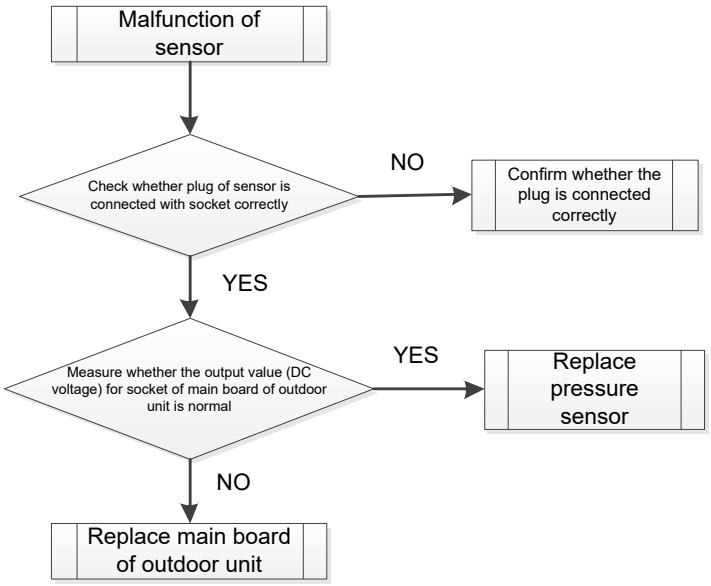
(4) Discharge temperature protection



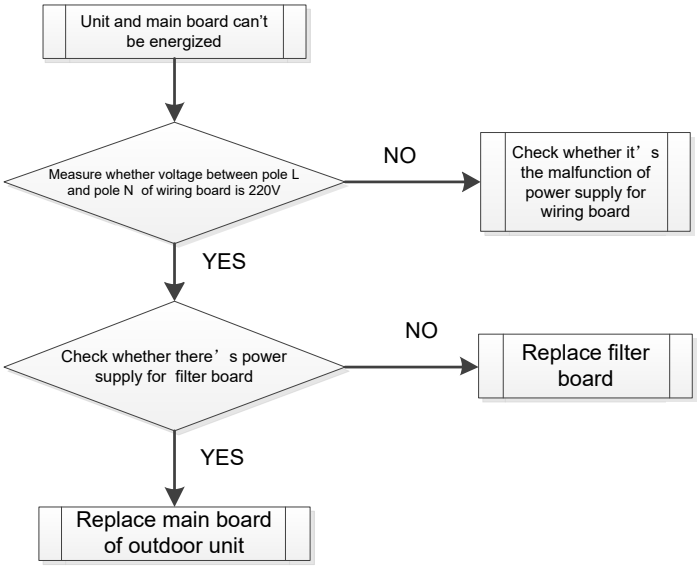
(5) Mafunction of temperature sensor



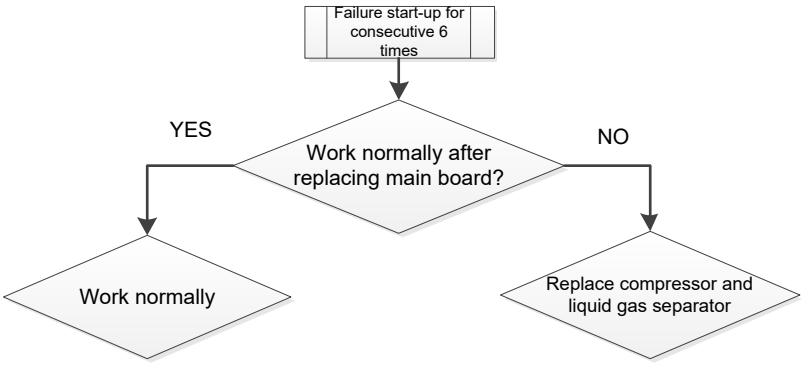
(6) Malfunction of sensor



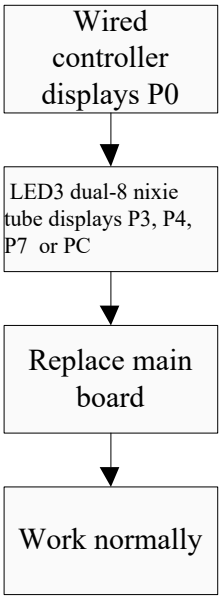
(7) Unit and main board can't be energized



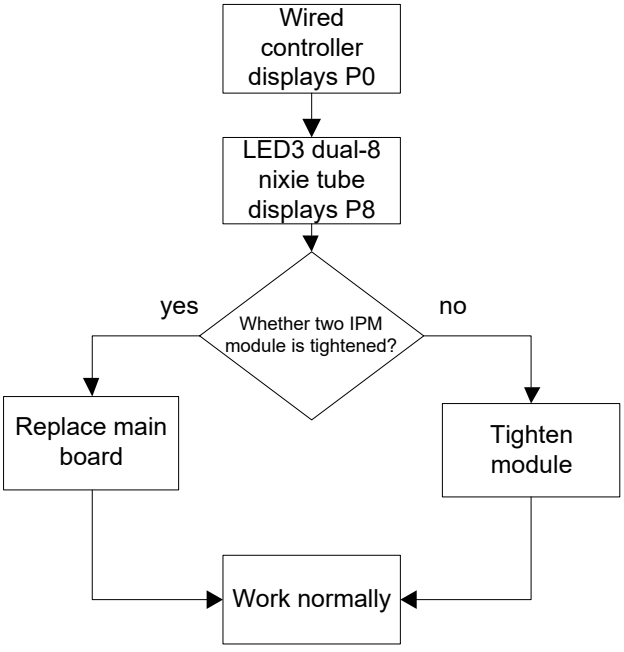
(8) Failure start-up



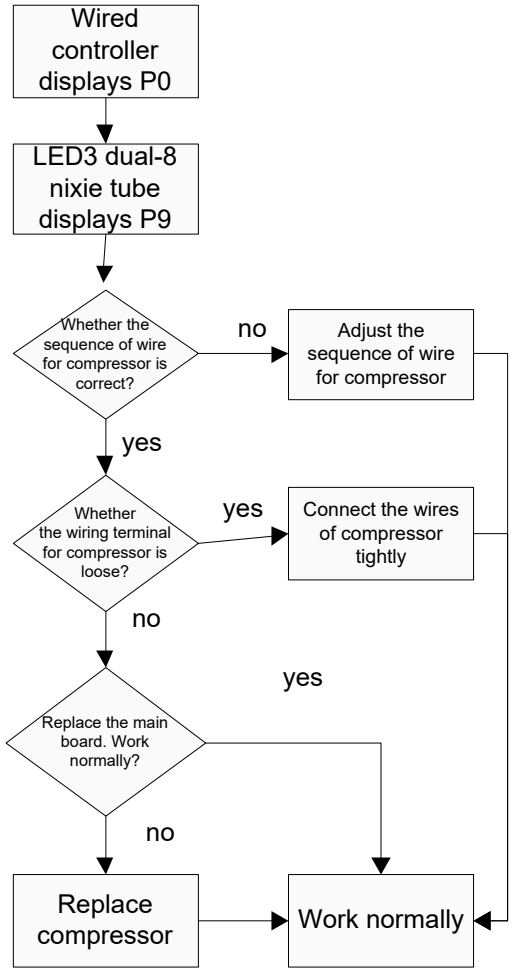
(9) Reset protection for drive module of compressor, drive PFC protection for compressor, malfunction of drive temperature sensor for compressor, circuit malfunction of drive current detection for compressor



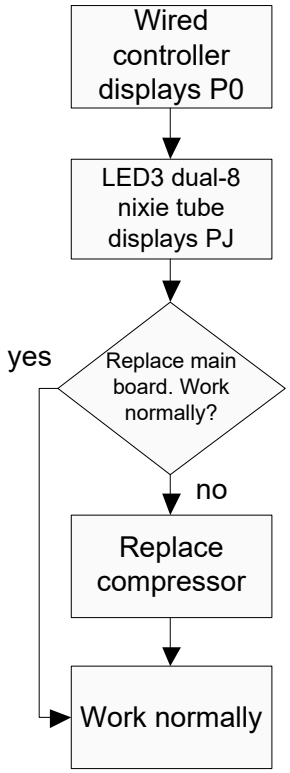
(10) Drive IPM overtemperature protection for compressor



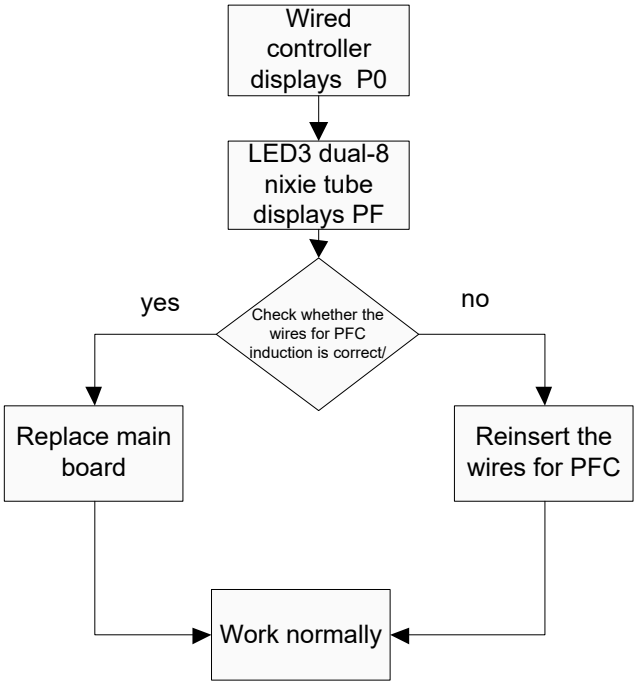
(11) Desynchronizing protection for inverter compressor



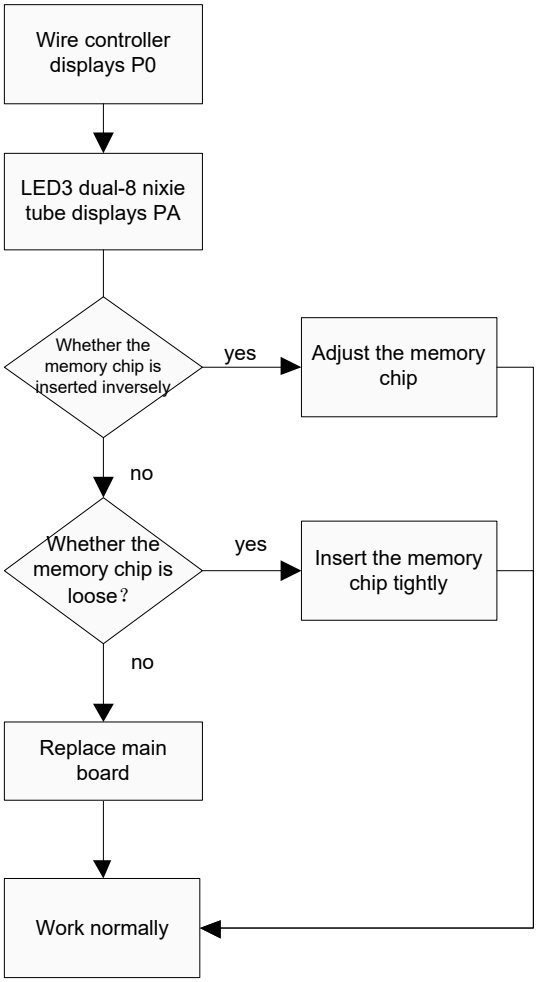
(12) Failure startup for inverter compressor



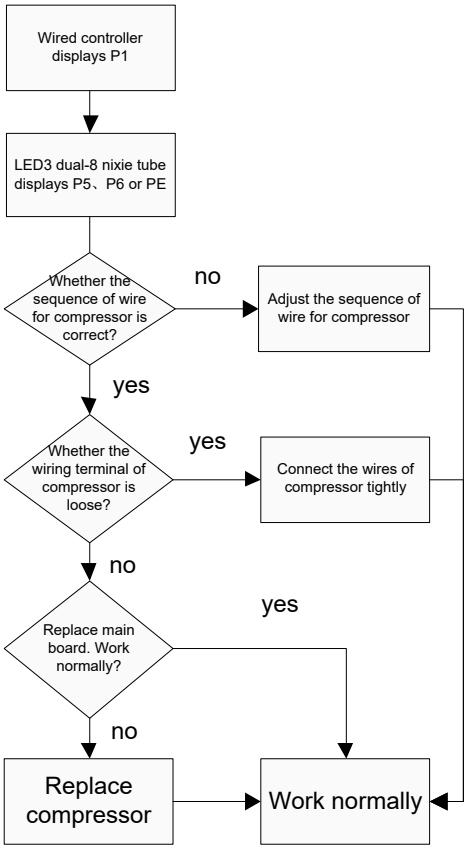
(13) Loop malfunction of driven charging for compressor



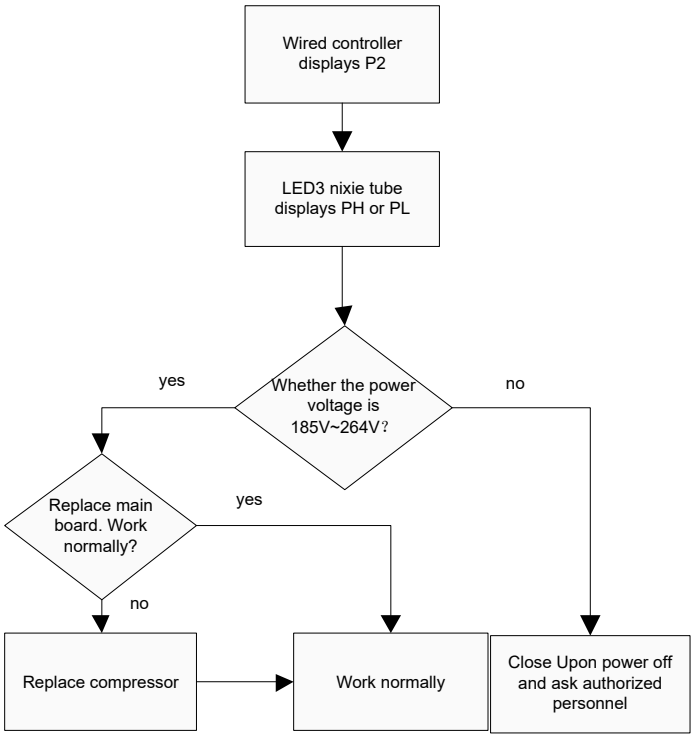
(14) Malfunction of memory chip for inverter compressor



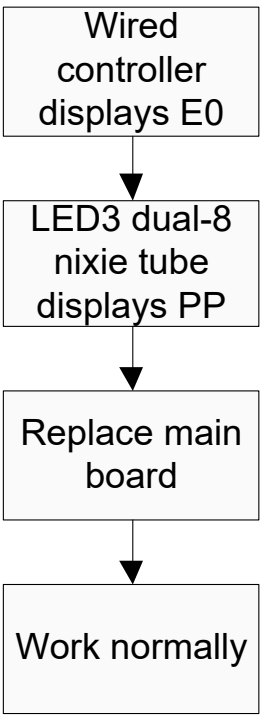
(15) Overcurrent protection for inverter compressor, IPM module protection, phase-lacking of inverter compressor



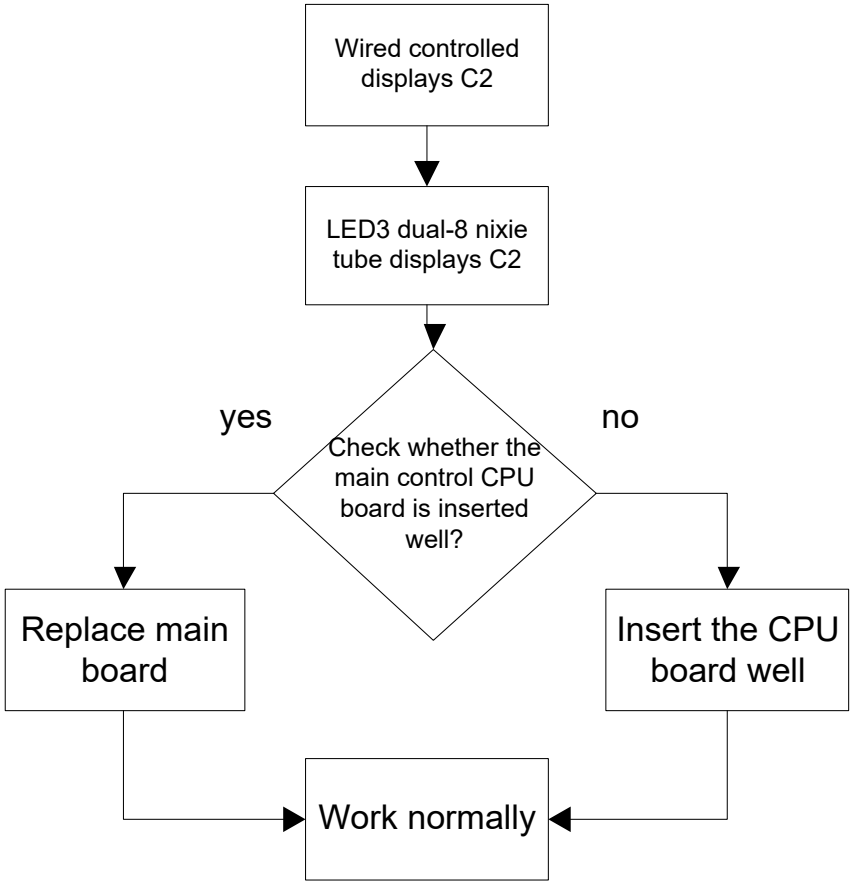
(16) High pressure protection for driven DC bus bar of compressor, low pressure protection for driven DC bus bar of compressor



(17) AC current protection for inverter compressor



(18) Communication malfunction between main contoller and driver of inverter compressor

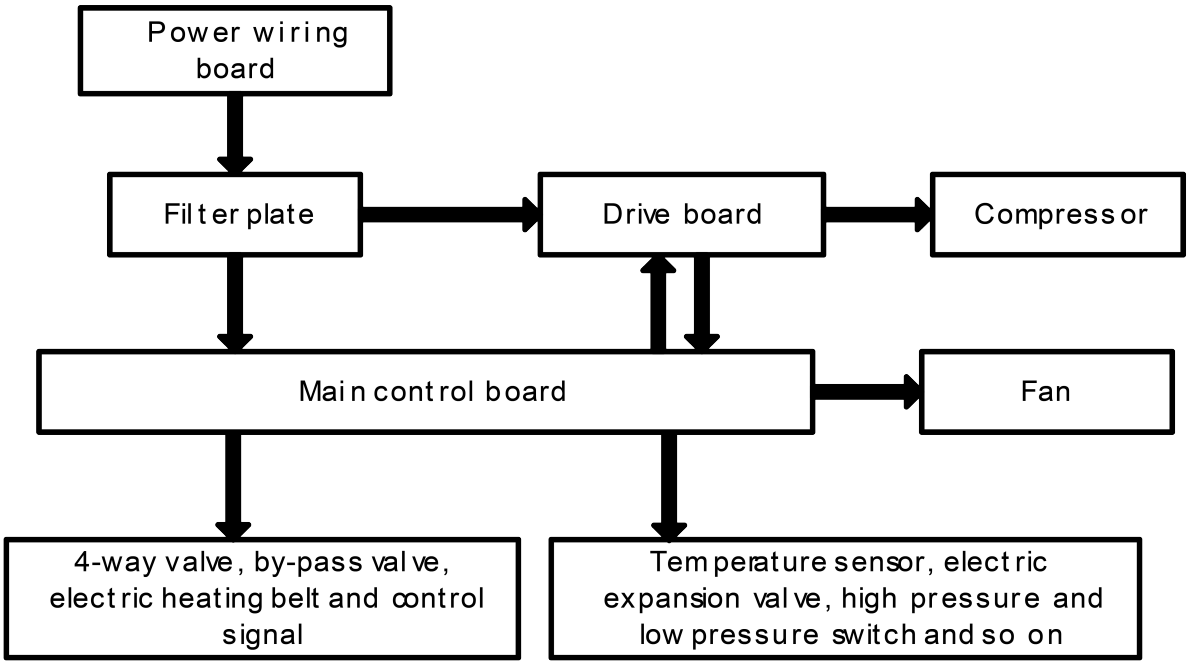


4 Power Distribution of Unit

4.1 Power Distribution of Unit

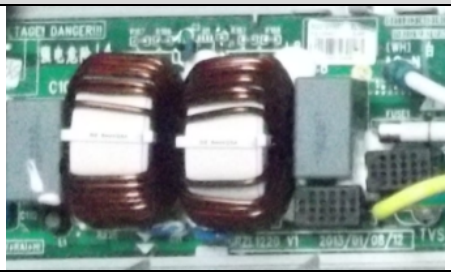
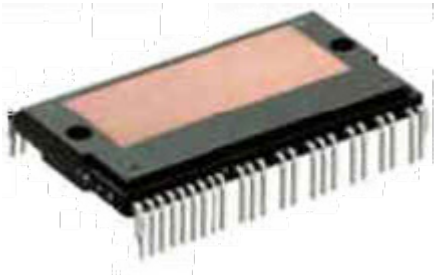
The control logical relationship among parts inside the electric box of unit is showed by the mongline diagram (CAD source file).

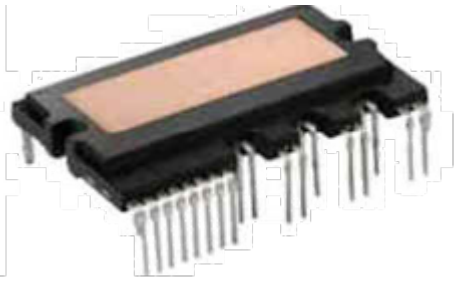
The main loop is showed by bold line (line width: 1mm); the control loop is showed by slim line (line width: 0.2mm).



(Bold line is the power line and the slim line is the control line)

4.2 Main Electric Parts

Name	Photo	Function introduction
Filter plate		It main effect is to eliminate the interference of power for protecting unit's anti-interference capability and prevent the interference to other electric appliances.
IPM Module		There are three complemental IGBT tube inside the IPM module. They are controlled by PWM wave and then bring the pressure of DC bus bar to different stator windings of compressor at different stage, and then generate current on the stator. Meanwhile, magnetic field will be generated on the stator winding, and push the operation of rotor and then drive compressor to operate.

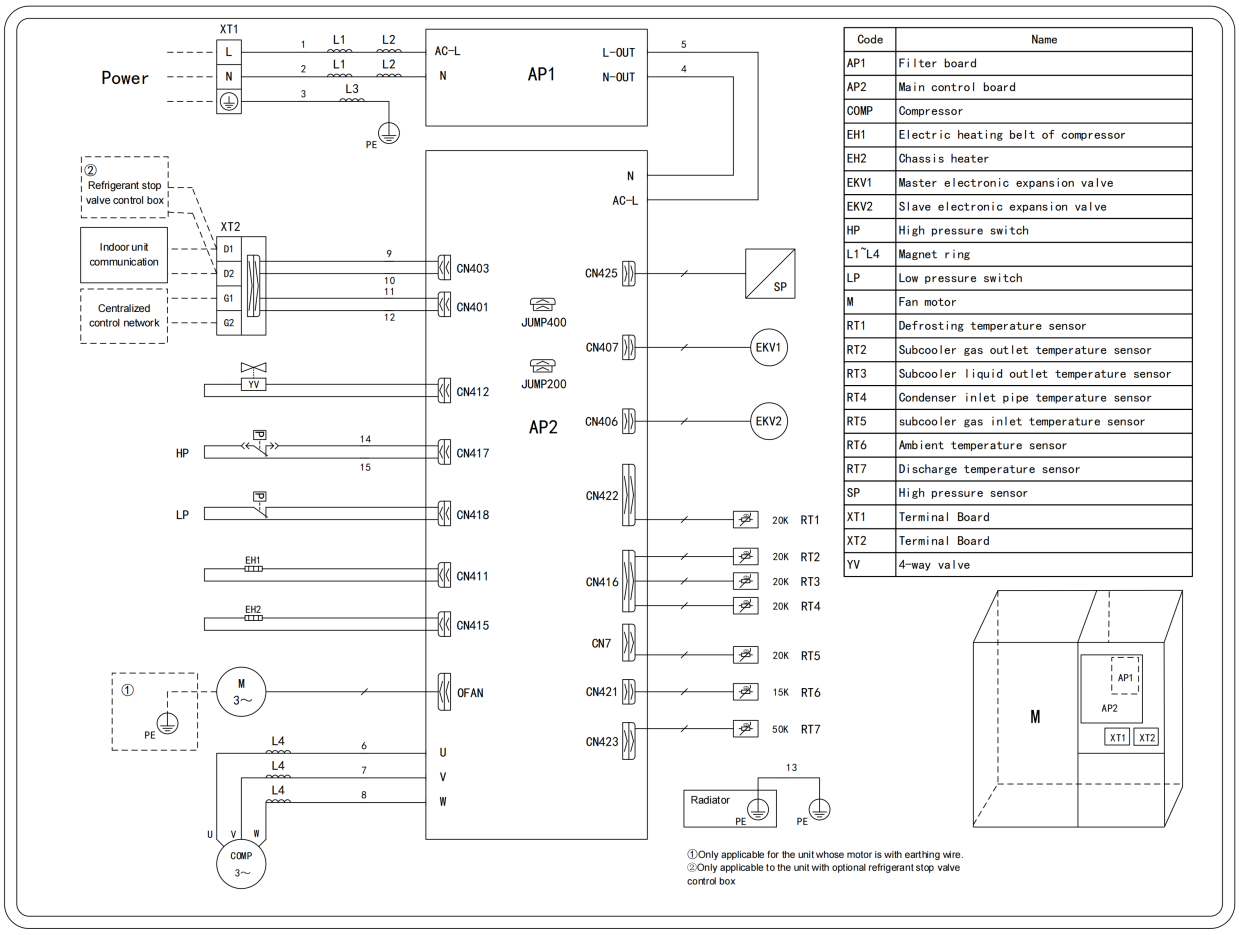
Name	Photo	Function introduction
PFC module		Four diodes and two MOS pipe are intergrated inside the PFC module. It will transform AC input power into DC power. Meanwhile, MOS pipe is controlled by PWM wave. Pressure will be increased by induction.

4.3 Circuit Diagram

Circuit diagram of outdoor unit

(The following are for reference only, the circuit diagram can be found on the unit)

GMV-S80WL/NhD-S, GMV-S100WL/NhD-S, GMV-S121WL/NhD-S, GMV-S141WL/NhD-S, GMV-S160WL/NhD-S



Code	Name
AP1	Filter board
AP2	Main control board
COMP	Compressor
EH1	Electric heating belt of compressor
EH2	Chassis heater
EKV1	Master electronic expansion valve
EKV2	Slave electronic expansion valve
HP	High pressure switch
L1~L4	Magnet ring
LP	Low pressure switch
M	Fan motor
RT1	Defrosting temperature sensor
RT2	Subcooler gas outlet temperature sensor
RT3	Subcooler liquid outlet temperature sensor
RT4	Condenser inlet pipe temperature sensor
RT5	subcooler gas inlet temperature sensor
RT6	Ambient temperature sensor
RT7	Discharge temperature sensor
SP	High pressure sensor
XT1	Terminal Board
XT2	Terminal Board
YV	4-way valve

5 Removal of Parts

5.1 Key Parts

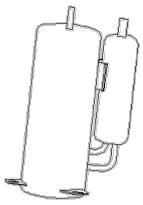
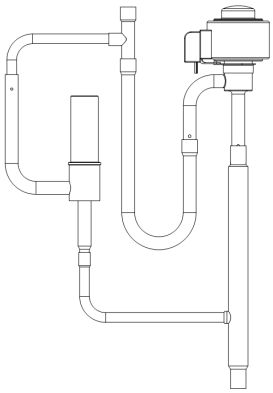
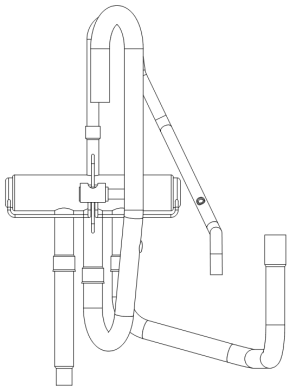
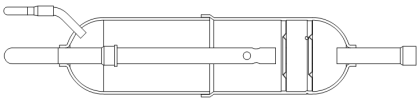
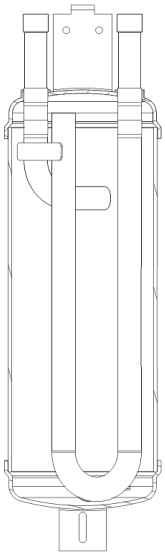
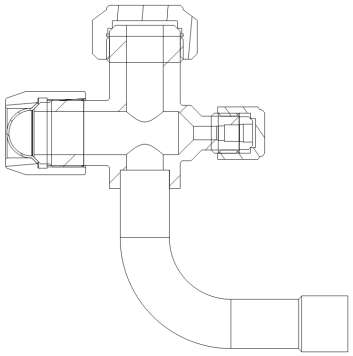
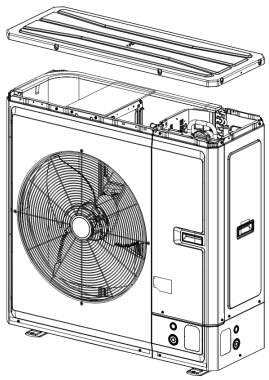
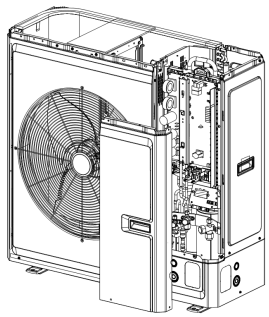
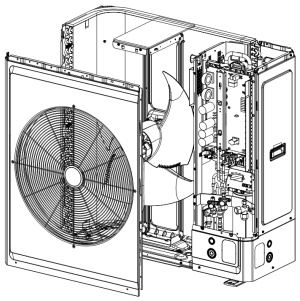
Photo	Name	Function
	compressor	Core part of air conditioning system. It sucks low temperature and low pressure gas, compress it to high temperature and high pressure gas, and then discharge it.
	Electronic expansion valve	Throttling device. It transforms high pressure refrigerant liquid into low pressure steam.
	4-way valve	It changes the flow direction of refrigerant for switching between cooling and heating.
	Oil separator	It stays between discharge outlet of compressor and inlet of condenser. It used for separating the lubricant oil of compressor when the high temperature and high pressure refrigerant gas is discharged from the compressor.
	Vapour liquid separator	It stays between outlet of evaporator and suction ouitlet of compressor. It used for separating low temperature and low pressure refrigerant.

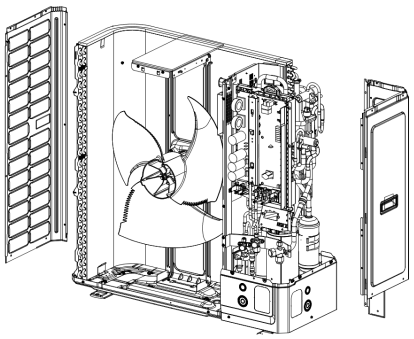
Photo	Name	Function
	Cut-off valve	It used for connecting indoor unit and outdoor unit, and used for maintenance and installation.

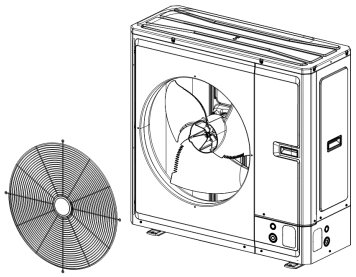
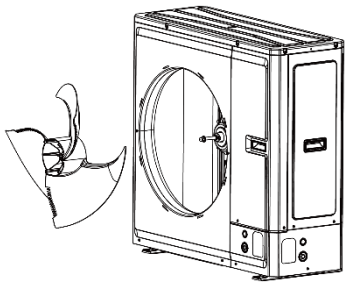
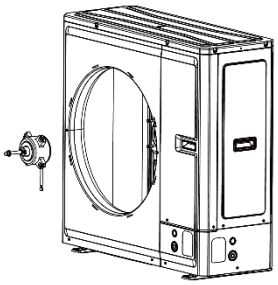
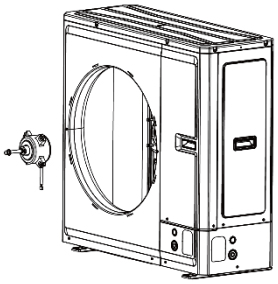
5.2 Removal of Key Parts

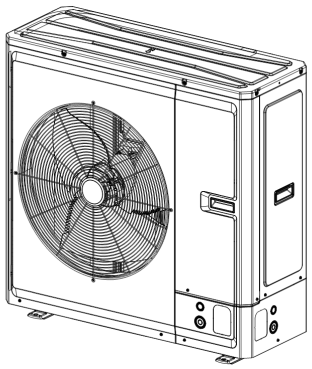
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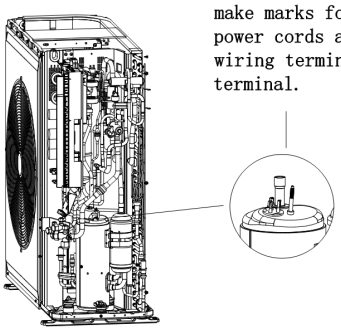
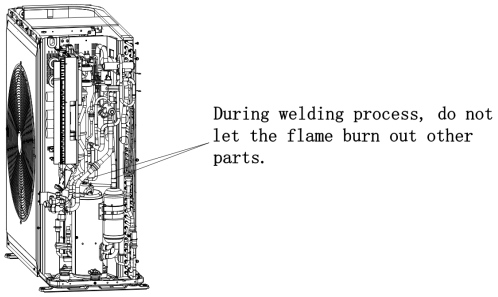
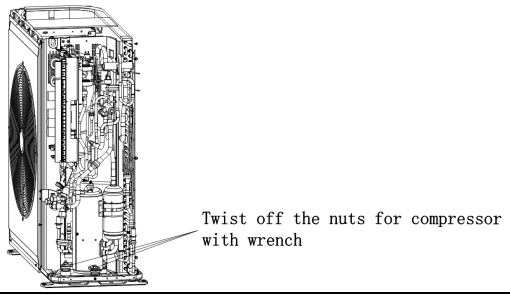
Series unit

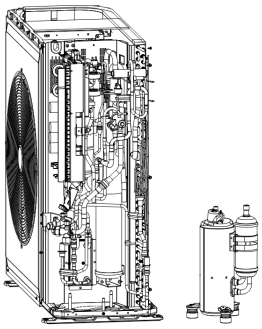
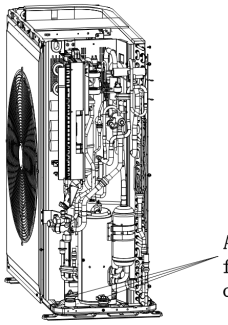
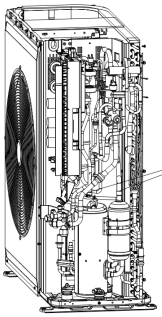
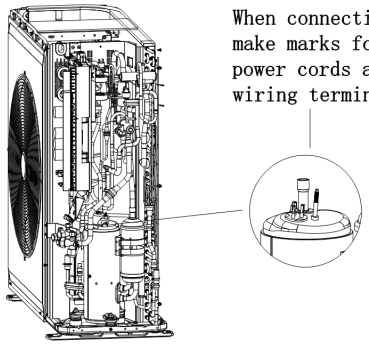
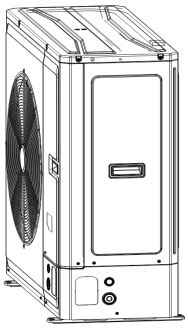
Removal operation for panel		
Remark: Before removing the panel, please make sure that the unit is disconected with the power		
Process	Photo	Operation Instruction
1.Remove top cover		● Loose the screws fixing the top cover with screwdriver ● Hold the top cover upwards and then put it on the floor flatly
2.Remove front side plate sub-assy		● Loose the screw fixing the front side plate with screwdriver ● Hold the front side plate upwards and then put it on the floor flatly
3.Remove front panel and grille		● Loose the screws fixing the front panel and grille with screwdriver ● Put the front panel and grille on the floor flatly

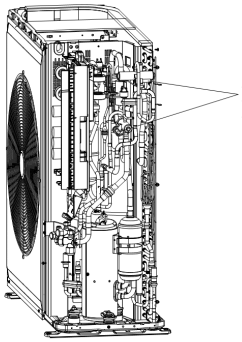
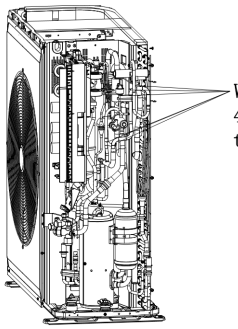
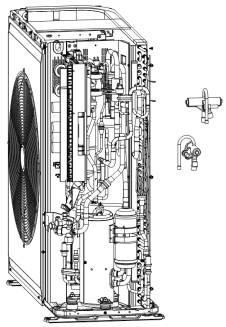
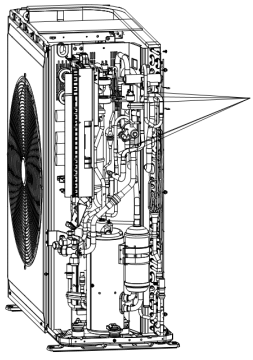
Removal operation for panel		
Remark: Before removing the panel, please make sure that the unit is disconected with the power		
Process	Photo	Operation Instruction
4.Remove left side plate and rear side plate		● Loose screws fixing left side plate and rear side plate with screwdriver ● remove the rear side plate

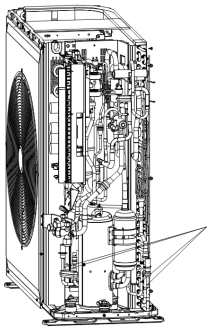
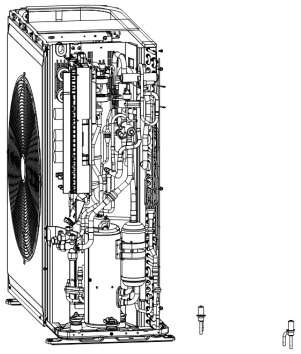
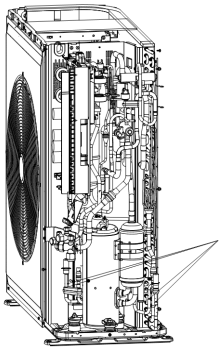
Removal operation for blade		
Remark: Before removing the motor, please make sure that the unit is disconnected with the power.		
Process	Photo	Operation Instruction
1.Remove grille		● Loose screws fixing the panel with screwdriver ● Then remove the grille
2.Remove blade		● Loosen nuts fixing the blade with wrench ● Then remove the blade and put it on the floor flatly
3.Remove motor		● Loose screws fixing the motor with screwdriver ● then remove the power cord of motor ● Take out the damaged motor
4.Install motor		● Replace the motor, tighten screws with screwdriver and then connect teh power cord of motor

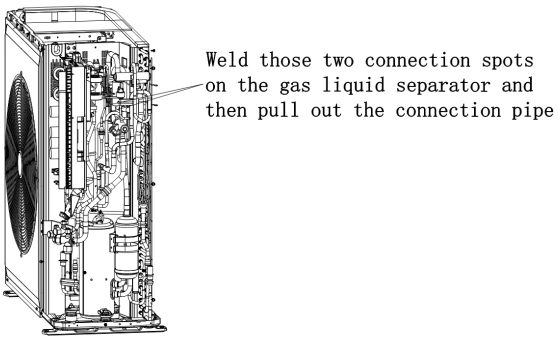
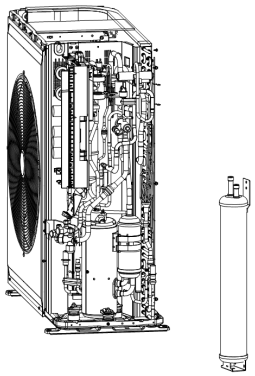
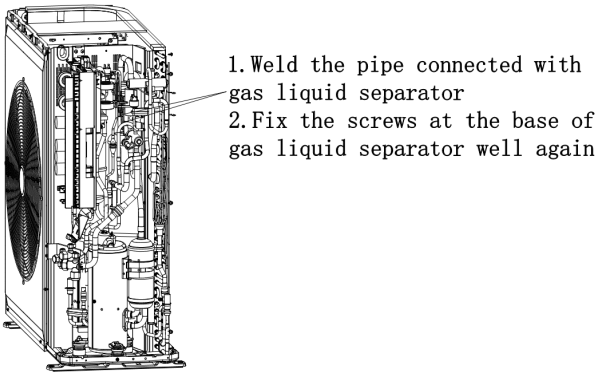
Removal operation for blade		
Remark: Before removing the motor, please make sure that the unit is disconnected with the power.		
Process	Photo	Operation Instruction
5.Assemble unit		● Assemble the unit in the the converse sequence

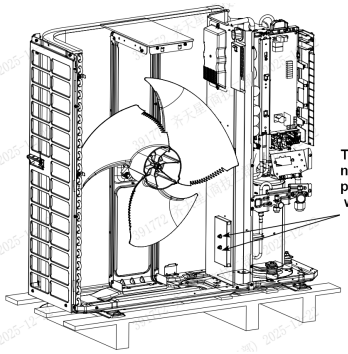
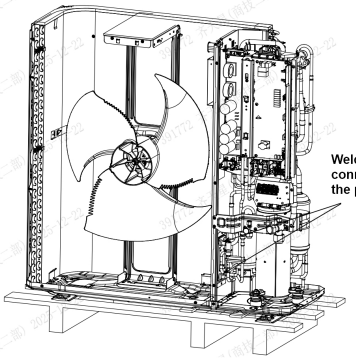
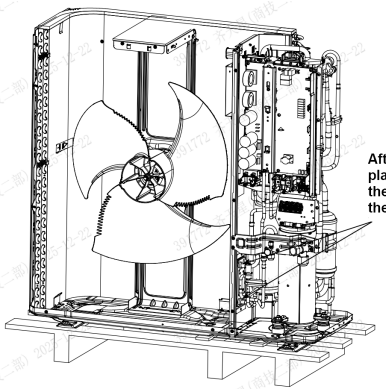
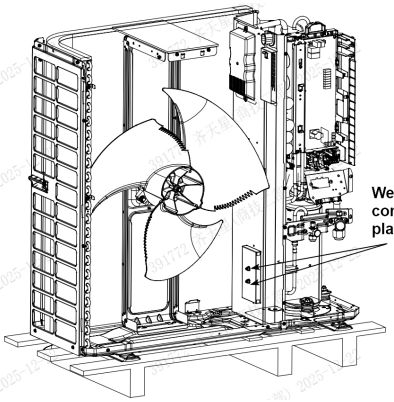
Removal operation of compressor		
Remark: Before removing the compressor, please make sure that there's no refrigerant inside the pipeline and the power is disconnected.		
Process	Photo	Operation Instruction
1.Remove wiring cover of compressor		● Loose screws fiixng the compressor with screwdriver ● Then pull out the power cord **NOTE**: When removing the power cord, make marks for different color power cords and corresponding wiring terminals for wrong terminal.
2.Disconnect compressor and connected pipeline		● Weld suction pipe and discharge pipe of compressor ● then pull out the connection pipe from the compressor **NOTE**: During welding process, do not let the flame burn out other parts.
3.Loose nuts fixing the foot of compressor		● Twist off the nuts for compressor with wrench

Removal operation of compressor		
Remark: Before removing the compressor, please make sure that there's no refrigerant inside the pipeline and the power is disconnected.		
Process	Photo	Operation Instruction
4.Remove the chassis from compressor		● Take out the compressor and replace it **NOTE**: When replacing the compressor, do not damage nearby pipelines and other parts
5.Fix the new compressor at the chassis		● After replacing the compresor, fix the nuts at the bottom of compressor
6.Connect suction pipe and discharge pipe of copressor and pipeline of system again		● Weld the connection pipe of compressor, connect the pipeline and compressor **NOTE**: During welding process, do not let flame burn out other parts
7.Connect the power cord of compressor well		● Loose screws fixing the power cord with screwdriver ● conenct the power cord well again **NOTE**: When connecting the power cord, make marks for different color power cords and corresponding wiring terminals
8.Check and open the upper cover plate		●Check whether the pipeline is connected well ●Check whetehr all parts and connection wires are connected well ●If there's no problem after checking, install front and rear cover plates

Removal operation for 4-way valve		
Remark: Before removing the 4-way valve, please make sure that there's no refrigerant inside the pipeline of system and then power is disconnected.		
Process	Photo	Operation Instruction
1.Disconnect the coil of 4-way valve from the 4-way valve		●Remove the coil of 4-way valve at first
2.Disconnect the 4-way valve and connection pipeline		● Weld those 4 connection spots on 4-way valve, and then pull out the connection pipe **NOTE**: During welding process, do not let the flae burn out other parts
3.Replace 4-way valve		● Replace 4-way valve **NOTE**: During welding process, do not let the flame burn out other parts
4.Replace 4-way valve		● Weld the connection position between 4-way valve and pipeline **NOTE**: During welding process, do not let flame burn out other parts

Remival operation for eletronic expansion valve		
Remark: Before removing the electronic expansion valve, please make sure that there's no refrigerant in th pipeline of system and the power is disconnected		
Process	Photo	Operation Instruction
1.Disconnec the electronic expansion valve from the pipeline	 Weld the connection pipe for expansion valve, and then pull out the connection pipe	● Remove the coil of electroc expansion valve at first ● Weld the connection pipe for expansion valve, and then pull out the connection pipe **NOTE**:During welding process, do not let flame burn out other parts
2.Take out the electronic expansion valve and replace it		●Take out the electronic expansion valve and replace it
3.Replace electronic expansion valve	 Weld the connection pipe of electronic expansion valve	● Weld the connection pipe of electronic expansion valve ● Inistall the coil of electronic expansion valve **NOTE**:During welding process, do not let the flame burn out other parts

Removal operation of gas liquid separator		
Remark: Before removing the gas liquid separator, please make sure that there's no refrigerant inside the pipeline of system and disconnect the power		
Process	Photo	Operation Instruction
1.Disconnect inlet pipe and exit pipe of gas liquid separator		● Weld those two connection spots on the gas liquid separator and then pull out the connection pipe **NOTE**: During welding process, do not let flame burn out other parts
2.Replace gas liquid separator		● Loose 4 screws with screwdriver ● Replace gas lliquid separator
3.Replace gas liquid separator		● Weld the pipe connected with gas liquid separator ● Fix the screws at the base of gas liquid separator well again **NOTE**: During welding process, do not let flame burn out other parts

Removal operation for plate heat exchanger		
Remark: Before removing the plate heat exchanger, please make sure that there's no refrigerant inside the pipeline of system and disconnect the power		
Process	Photo	Operation Instruction
1.Twist off two nuts fixing the plate heat exchanger with wrench		●Twist off two nuts fixing the plate heat exchanger with wrench
2.Disconnect inlet pipe and outlet pipe of plate heat exchanger		● Weld those 4 connection spots on the plate heat exchanger, and then pull out the connection pipe. **NOTE**: During welding process, do not let flame burn out other parts
3.Replace plate heat exchanger		●Replace plate heat exchanger
4.Replace gas liquid separator		● Weld the pipe connected with plate heat exchanger **NOTE**: During welding process, do not let flame burn out other parts

6 Common Maintenance

6.1 Minimum Room Area for R32 Unit

6.1.1 Calculation Method of Releasable Charge (m_{REL})

Area of the room where the indoor unit is installed must meet the minimum room area in the following table:

Table 1:

Refrigerant Amount (kg)	Minimum Room Area(m^2)					
	$H_0 \geq 2.2m$					
	H=2.2m	H=2.5m	H=3m	H=3.5m	H=4m	H=5m
2	4	3.5	2.9	2.5	2.2	1.8
2.2	4.4	3.9	3.2	2.8	2.4	2
2.4	4.8	4.2	3.5	3	2.7	2.1
2.6	5.2	4.6	3.8	3.3	2.9	2.3
2.8	5.6	4.9	4.1	3.5	3.1	2.5
3	6	5.3	4.4	3.8	3.3	2.7
3.2	6.4	5.6	4.7	4	3.5	2.8
3.4	6.8	6	5	4.3	3.7	3
3.6	7.2	6.3	5.3	4.5	4	3.2
3.8	7.6	6.7	5.6	4.8	4.2	3.4
4	7.9	7	5.8	5	4.4	3.5
4.2	8.3	7.3	6.1	5.3	4.6	3.7
4.4	8.7	7.7	6.4	5.5	4.8	3.9
4.6	9.1	8	6.7	5.8	5	4
4.8	9.5	8.4	7	6	5.3	4.2
5	9.9	8.7	7.3	6.3	5.5	4.4
5.2	10.3	9.1	7.6	6.5	5.7	4.6
5.4	10.7	9.4	7.9	6.8	5.9	4.7
5.6	11.1	9.8	8.2	7	6.1	4.9
5.8	11.5	10.1	8.4	7.2	6.3	5.1
6	11.9	10.5	8.7	7.5	6.6	5.3
6.2	12.3	10.8	9	7.7	6.8	5.4
6.4	12.7	11.2	9.3	8	7	5.6
6.6	13.1	11.5	9.6	8.2	7.2	5.8
6.8	13.5	11.9	9.9	8.5	7.4	6
7	13.9	12.2	10.2	8.7	7.7	6.1
7.2	14.3	12.6	10.5	9	7.9	6.3
7.4	14.7	12.9	10.8	9.2	8.1	6.5
7.6	15.1	13.3	11.1	9.5	8.3	6.7
7.8	15.4	13.6	11.3	9.7	8.5	6.8
8	15.8	13.9	11.6	10	8.7	7
8.2	16.2	14.3	11.9	10.2	9	7.2
8.4	16.6	14.6	12.2	10.5	9.2	7.3
8.6	17	15	12.5	10.7	9.4	7.5
8.8	17.4	15.3	12.8	11	9.6	7.7
9	17.8	15.7	13.1	11.2	9.8	7.9
9.2	18.2	16	13.4	11.5	10	8
9.4	18.6	16.4	13.7	11.7	10.3	8.2

Refrigerant Amount (kg)	Minimum Room Area(m^2)					
	$H_0 \geq 2.2m$					
	H=2.2m	H=2.5m	H=3m	H=3.5m	H=4m	H=5m
9.6	19	16.7	13.9	12	10.5	8.4
9.8	19.4	17.1	14.2	12.2	10.7	8.6
10	19.8	17.4	14.5	12.5	10.9	8.7
10.2	20.2	17.8	14.8	12.7	11.1	8.9
10.4	20.6	18.1	15.1	13	11.3	9.1
10.6	21	18.5	15.4	13.2	11.6	9.3
10.8	21.4	18.8	15.7	13.5	11.8	9.4
11	21.8	19.2	16	13.7	12	9.6
11.2	22.2	19.5	16.3	13.9	12.2	9.8
11.4	22.6	19.9	16.6	14.2	12.4	10
11.6	23	20.2	16.8	14.4	12.6	10.1
11.8	23.3	20.5	17.1	14.7	12.9	10.3
12.0	23.7	20.9	17.4	14.9	13.1	10.5

Table 2:

Refrigerant Amount (kg)	Minimum Room Area(m^2)					
	$H_0 \geq 2.2m$					
	H=2.2m	H=2.5m	H=3m	H=3.5m	H=4m	H=5m
2	6	5.3	4.4	3.8	3.3	2.7
2.2	6.6	5.8	4.8	4.1	3.6	2.9
2.4	7.2	6.3	5.3	4.5	4	3.2
2.6	7.7	6.8	5.7	4.9	4.3	3.4
2.8	8.3	7.3	6.1	5.3	4.6	3.7
3	8.9	7.9	6.6	5.6	4.9	4
3.2	9.5	8.4	7	6	5.3	4.2
3.4	10.1	8.9	7.4	6.4	5.6	4.5
3.6	10.7	9.4	7.9	6.8	5.9	4.7
3.8	11.3	10	8.3	7.1	6.2	5
4	11.9	10.5	8.7	7.5	6.6	5.3
4.2	12.5	11	9.2	7.9	6.9	5.5
4.4	13.1	11.5	9.6	8.2	7.2	5.8
4.6	13.7	12	10	8.6	7.5	6
4.8	14.3	12.6	10.5	9	7.9	6.3
5	14.9	13.1	10.9	9.4	8.2	6.6
5.2	15.4	13.6	11.3	9.7	8.5	6.8
5.4	16	14.1	11.8	10.1	8.8	7.1
5.6	16.6	14.6	12.2	10.5	9.2	7.3
5.8	17.2	15.2	12.6	10.8	9.5	7.6
6	17.8	15.7	13.1	11.2	9.8	7.9
6.2	18.4	16.2	13.5	11.6	10.1	8.1
6.4	19	16.7	13.9	12	10.5	8.4
6.6	19.6	17.2	14.4	12.3	10.8	8.6
6.8	20.2	17.8	14.8	12.7	11.1	8.9
7	20.8	18.3	15.3	13.1	11.5	9.2
7.2	21.4	18.8	15.7	13.5	11.8	9.4
7.4	22	19.3	16.1	13.8	12.1	9.7
7.6	22.6	19.9	16.6	14.2	12.4	10

Refrigerant Amount (kg)	Minimum Room Area(m^2)					
	$H_0 \geq 2.2m$					
	H=2.2m	H=2.5m	H=3m	H=3.5m	H=4m	H=5m
7.8	23.1	20.4	17	14.6	12.8	10.2
8	23.7	20.9	17.4	14.9	13.1	10.5
8.2	24.3	21.4	17.9	15.3	13.4	10.7
8.4	24.9	21.9	18.3	15.7	13.7	11
8.6	25.5	22.5	18.7	16.1	14.1	11.3
8.8	26.1	23	19.2	16.4	14.4	11.5
9	26.7	23.5	19.6	16.8	14.7	11.8
9.2	27.3	24	20	17.2	15	12
9.4	27.9	24.5	20.5	17.5	15.4	12.3
9.6	28.5	25.1	20.9	17.9	15.7	12.6
9.8	29.1	25.6	21.3	18.3	16	12.8
10	29.7	26.1	21.8	18.7	16.3	13.1
10.2	30.3	26.6	22.2	19	16.7	13.3
10.4	30.8	27.2	22.6	19.4	17	13.6
10.6	31.4	27.7	23.1	19.8	17.3	13.9
10.8	32	28.2	23.5	20.2	17.6	14.1
11	32.6	28.7	23.9	20.5	18	14.4
11.2	33.2	29.2	24.4	20.9	18.3	14.6
11.4	33.8	29.8	24.8	21.3	18.6	14.9
11.6	34.4	30.3	25.2	21.6	18.9	15.2
11.8	35	30.8	25.7	22	19.3	15.4
12.0	35.6	31.3	26.1	22.4	19.6	15.7

NOTES!

(1) H_0 is the release height, H_{inst} is the installation height, H_0 is higher than H_{inst}.

(2) H is the floor-to-ceiling height of the room.

(3) If the actual H is not exactly equal to the value in the table, the smaller H in the table need to be taken.

(4) For spaces except lowest underground floor of the building, the total refrigerant amount and the room must meet the requirements of Table 1. If the cut-off valve box is installed, the releasable amount m_{rl} after cutoff and the room area must meet the requirements of Table 1.

(5) For lowest underground floor of the building, the total refrigerant amount and the room area must meet the requirements of Table 2. If the cut-off valve box is installed, the releasable amount m_{rl} after cutoff and the room area must meet the requirements of Table 2, while the total refrigerant amount and the room area must also meet the requirements of Table 1.

(6) If the actual releasable charge is not exactly equal to the value in the table, the larger releasable charge in the table need to be taken.

(7) This manual is only applicable to a single room.

(8) Correct the minimum room area of the space Amin by multiplying by an altitude adjustment factor (AF) based on for building site ground level altitude (Halt) in meters.

Halt	0	200	400	600	800	1000	1200	1400	1600
AF	1.00	1.00	1.00	1.00	1.02	1.05	1.07	1.10	1.12
Halt	1600	1800	2000	2200	2400	2600	2800	3000	3200
AF	1.12	1.15	1.18	1.21	1.25	1.28	1.32	1.36	1.40

(9) The minimum airflow is 240m^3/h.

(10) LEAK DETECTION SYSTEM installed. Unit must be powered except for service.

6.1.2 Calculation Method of Releasable Charge (m_{REL})

The shut-off valve box can be installed at the outdoor unit side, or the indoor unit side. When the indoor unit detects a refrigerant leak, all shut-off valves will automatically close to isolate the refrigerant system and prevent further leakage. The releasable charge (m_{rl}) refers to the total amount of refrigerant remaining in all downstream indoor units and pipeline that may leak into the room.

m_{rl} =(0.133*m_C)+0.924+m_1+m_2

m_C is total refrigerant amount in the system (including the default refrigerant of outdoor unit and the additional refrigerant charge).

m_1 is the releasable charge of all indoor units downstream of the shut-off valve box.

m_2 is the releasable charge of all pipelines downstream of the shut-off valve box.

If the calculated m_{rl} is larger than the m_C, the m_C should be used as m_{rl}.

m_1 of different indoor unit must refer to corresponding Owner's Manual of indoor unit.

All pipelines in the system are divided into three types A/B/C according to pipe dimension. Count the total pipe length of each type and find out m_2 of corresponding type in the table below. Add up all m_2 of each type to obtain the m_2 of the system.

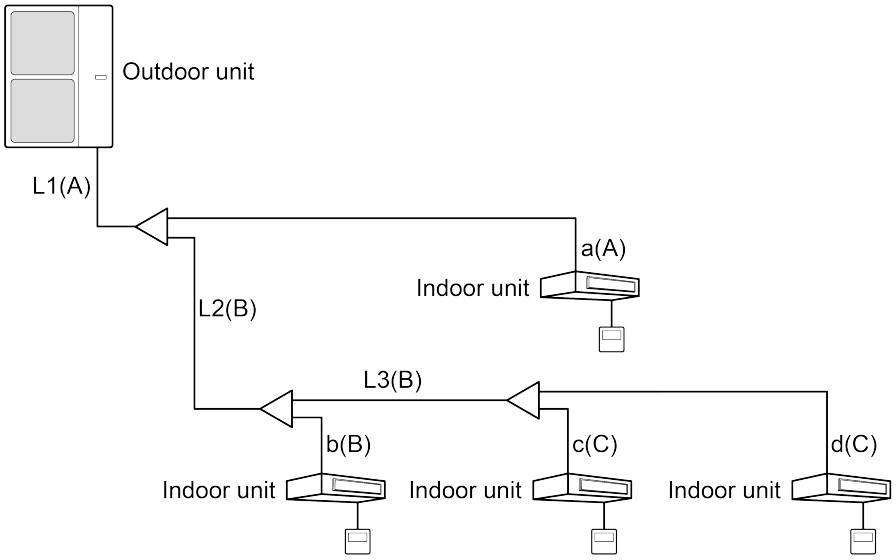
m_2 of pipeline:

Unit: kg

Pipe Type		A	B	C
Gas Pipe mm		15.9	12.7	9.52
Liquid Pipe mm		9.52	6.35	6.35
Total Pipe Length m	5	0.31	0.13	0.11
	10	0.61	0.26	0.22
	15	0.91	0.38	0.33
	20	1.21	0.51	0.44
	25	1.52	0.64	0.55
	30	1.82	0.76	0.66
	35	2.12	0.89	0.77
	40	2.42	1.01	0.87
	45	2.72	1.14	0.98
	50	3.03	1.27	1.09
	55	3.33	1.39	1.20
	60	3.63	1.52	1.31
	65	3.93	1.64	1.42
	70	4.23	1.77	1.53
	75	4.54	1.90	1.64
	80	4.84	2.02	1.74
	85	5.14	2.15	1.85

Pipe Type		A	B	C
Gas Pipe mm		15.9	12.7	9.52
Liquid Pipe mm		9.52	6.35	6.35
Total Pipe Length m	90	5.44	2.27	1.96
	95	5.74	2.40	2.07
	100	6.05	2.53	2.18

For example:



There are four indoor units in the system:

GMV-ND71G/NhA1C-T*1 and GMV-ND28G/NhA1C-T*3.

The total length of type A pipeline L1+a is 10m. m_2 of type A is 0.61kg.

The total length of type B pipeline L2+L3+b is 30m. m_2 of type B is 0.76kg.

The total length of type C pipeline c+d is 20m. m_2 of type C is 0.44kg.

The system refrigerant amount is 7kg.

The releasable charge (m_{rl}) should be calculated as below:

m_1=0.39+0.2*3=0.99kg

m_2=0.61+0.76+0.44=1.81kg

m_{rl}=0.573kg+0.924kg+0.99kg+1.81kg=4.297kg

For 3 meters high room, the room area must not less than 11.3m^2. If the room area is less than 11.3m^2, measures need to be taken to make the room area meet the requirements, such as changing the piping design of the system to reduce the m_{rl}.

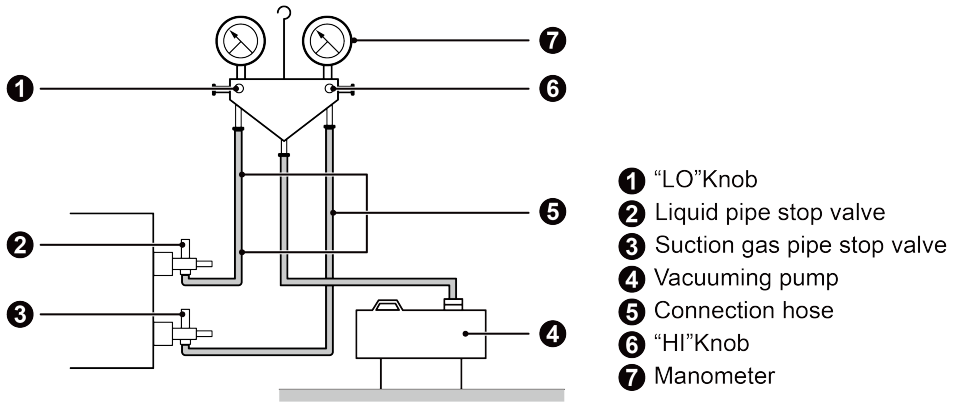
6.2 Vacuum Pumping, Refrigerant Adding

6.2.1 Vacuum Pumping

(1) Outdoor unit has been charged with refrigerant before delivery. Field-installed connection pipe needs to be charged with additional refrigerant.

(2) Confirm whether outdoor liquid and gas valves are closed.

(3) Use vacuum pump to withdraw the air inside indoor unit and connection pipe from the outdoor valve, as shown below.



6.2.2 Additional Refrigerant Charging

(1) Calculation of Additional Refrigerant Charge:

1) Additional refrigerant charge R = pipeline additional refrigerant charge A + indoor unit additional refrigerant charge B+ high pressure gas pipe additional refrigerant charge C+

2) Calculation of pipeline additional refrigerant charge A

Pipeline additional refrigerant charge A =∑(Liquid pipe length×amount of additional refrigerant of each 1m)

Diameter of liquid pipe (mm)	Φ19.05	Φ15.9	Φ12.7	Φ9.52	Φ6.35
kg/m	0.240	0.160	0.100	0.051	0.018

3) Calculation of indoor unit additional refrigerant charge B

Additional refrigerant charge B= additional refrigerant charge of Standard indoor unit+ additional refrigerant charge of Special indoor unit indoor unit.

The Additional refrigerant charge of indoor units according to the table below.

Quantity of Standard indoor units	additional refrigerant charge/ kg
≤3	0.25
4	0.50
5	0.70
6	0.90
≥7	1.20

Quantity of special indoor units (hot water generator or hot water converter)	additional refrigerant charge kg
1	0.20
2	0.40
3	0.60

4) Calculation of high pressure gas pipe additional refrigerant charge C

High pressure gas pipe additional refrigerant charge C =∑High pressure gas pipe length×amount of additional refrigerant of each 1m)

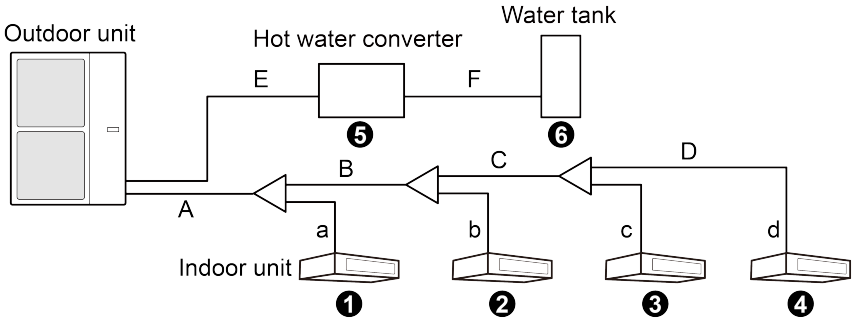
Diameter of high pressure gas pipe (mm)	Φ19.05	Φ15.9	Φ12.7	Φ9.52
kg/m	0.05	0.03	0.02	0.012

NOTE!

The maximum refrigerant charging volume for the system can't exceed 7 kg (including the refrigerant charged in the factory).

Record the amount of refrigerant added to facilitate after-sales maintenance. After ensuring that the system does not leak and the compressor is not working, first charge the specified amount of R32 into the unit from the injection port of the outdoor unit liquid pipe valve until the required amount is reached. If the amount of refrigerant that needs to be added cannot be filled quickly due to pressure rise in the pipe, then power on the unit in cooling mode and charge the refrigerant through the gas valve of the outdoor unit.

(2) Calculation example.



IDU:

No.	IDU 1	IDU 2	IDU 3
Model	Duct type GMV-ND80PHS/NhD-T	Duct type GMV-ND50PHS/NhD-T	Duct type GMV-ND36PHS/NhD-T
No.	IDU 4	IDU 5	IDU 6
Model	Duct type GMV-ND25PHS/NhD-T	NRZ16G/NhB-S	SXTD300LCJW/Za-K

Liquid pipe:

No.	A	B	C	D
Pipe size	Φ9.52	Φ9.52	Φ9.52	Φ6.35
Length	10m	5m	5m	5m
No.	a	b	c	d
Pipe size	Φ9.52	Φ6.35	Φ6.35	Φ6.35
Length	3m	3m	2m	1m
No.	E	F	/	/
Pipe size	Φ12.7	Φ9.52	/	/
Length	10m	5m	/	/

Total length of each liquid pipe.

Φ9.52: A+B+C+a=10+5+5+3=23m.

Φ6.35: D+b+c+d=5+3+2+1=11m.

Total length of each high pressure gas pipe.

Φ12.7: E=10m.

Φ9.52: F=5m.

Quantity of standard indoor indoor unit: 4 sets.

Quantity of special indoor indoor unit: 1 set.

Therefore, the minimum quantity of additional refrigerant = (23×0.051+11×0.018) + (10×0.03+5×0.015)+(0.5+0.2) = 2.446kg.

6.3 Airtightness Test

6.3.1 Importance of Airtightness Test

The airtightness of VRF system is the leak tightness of the pipeline for refrigerant, which the guarantee for safe and reliable operation. The leakage of refrigerant may affect the operation of air conditioner seriously, or even damage compressor and then lead to breakdown of system. Therefore, it needs to perform the airtightness test. If the there's gas leakage after the system is installed completely, because the indoor ceiling decoration are all finished, it's will be very difficult to find out the leakage point. Thus, the airtightness test of the system must be finished before finishing indoor decoration.

6.3.2 Operation Procedure for The Airtightness Test

Before ex-factory, cut-off valve for gas pipe and liquid pipe of outdoor unit is turned off. Please confirm that before operation.

Before testm please smear a little corresponding lubricant oil at and pipe terminal, and use two wrenches for fixing

Do not allow to connect the pipeline of outdoor unit for test during airtightness test.

The system test pressure for R32 is 4.15MPa. Nitrogen must be used as the medium for the airtightness test and the nitrogen should be dry. Increase pressure slowly for three steps:

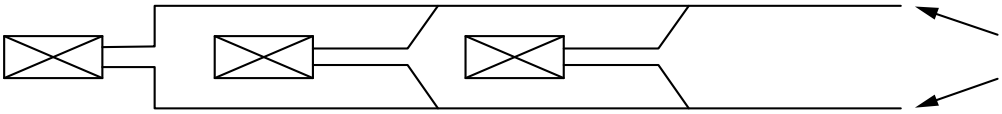
Step 1: Increase pressure slowly to 0.5MPa, stop for 5min and then check the gas leakage. Big leakage may be found out;

Step 2: Increase pressure slowly to 1.5MPa, stop for 5min to check the airtightness. Small leakage may be found out;

Step 3: Increase pressure slowly to 4.15MPa for R32 slowly, stop for 5min and perform the strength test. Minor leakage or sand hole may be found. Increase pressure to test pressurem, keep it for 24h and observe whether the pressure is decreasing. If not, the pressure is qualified.

6.3.3 Cautions

(1) The test manometer range for R32 should be 4.5MPa above.
(2) Record the data on manometerk, ambient temperature and test time at the same time.
(3) Pressure modification: when temperature changes 1°C, the temperature will change 0.01MPa correspondingly.
(4) Pressure should be kept the same.
(5) If it needs to keep pressure for a long time, decrease the pressire lower than 0.55MPa pr below. Long-time high pressure can lead to leakage at the welding position, which may cause riskl.
(6) Before the airtightness for the pipeline of refrigerant is finished, do not allow to insulate and bundle the welding positions and connection position of bellmouth of indoor unit.



Add pressure from gas pipe and liquid pipeat the same time

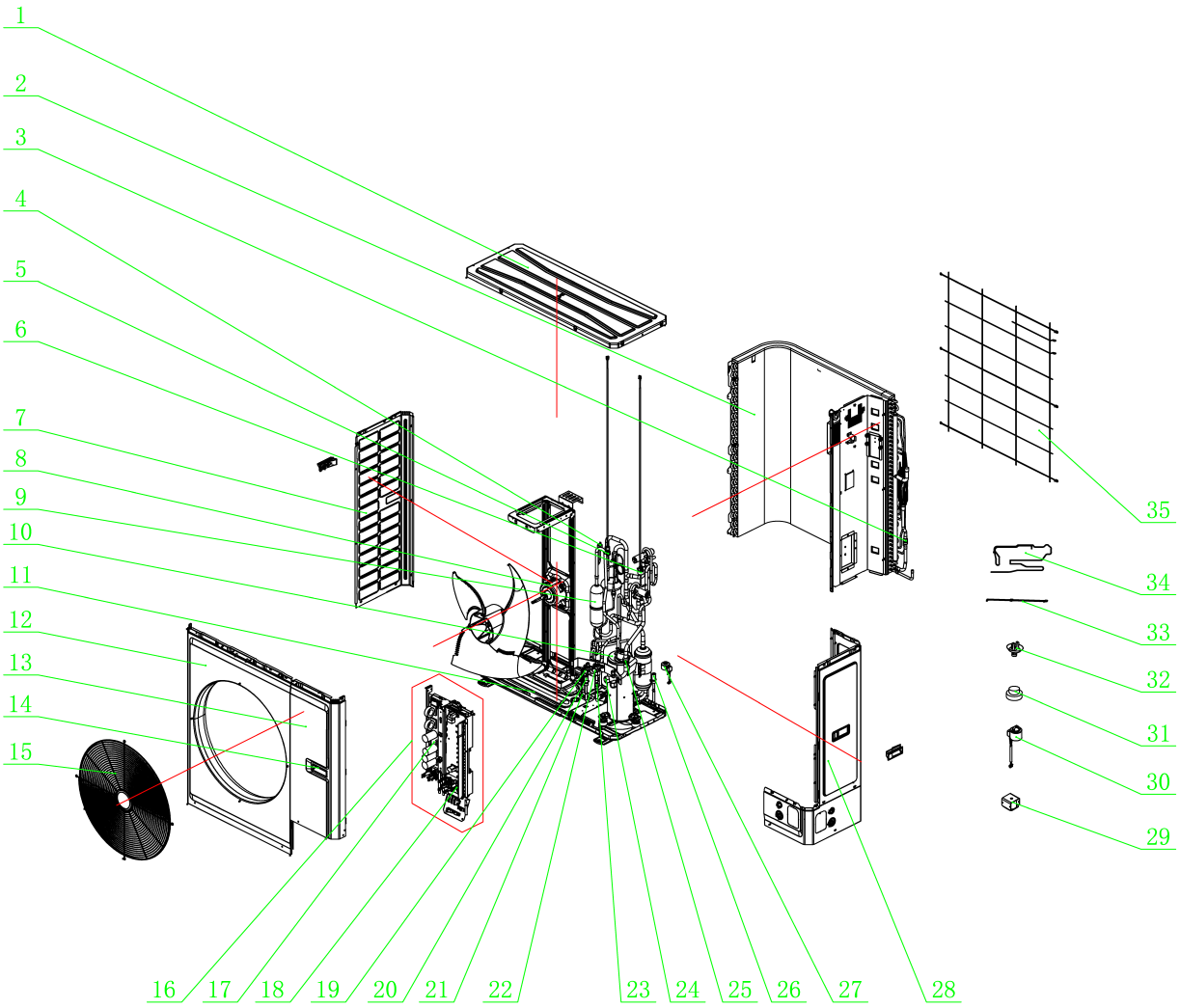
NOTE: Before airtightness test, all welding lines can't be insulated and bundled.

7 Exploded View of Unit and Parts' List

7.1 Exploed View for Outdoor Unit and Parts' List

Model: GMV-S80WL/NhD-S, GMV-S100WL/NhD-S, GMV-S121WL/NhD-S, GMV-S141WL/NhD-S, GMV-S160WL/NhD-S

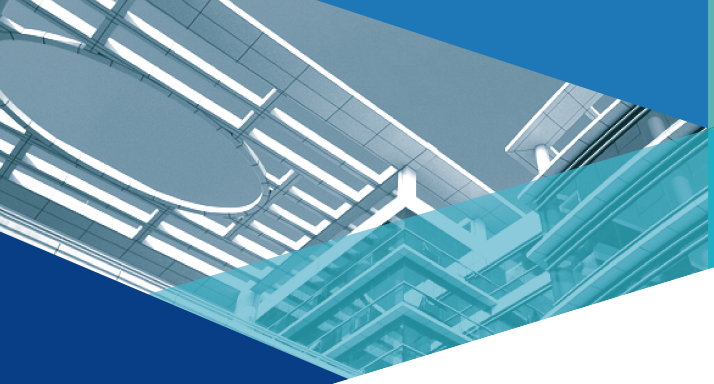
Exploded view



NO.	Name of Part
1	Top Cover Sub-Assy
2	Condenser Assy
3	Strainer
4	Pressure Protect Switch
5	Pressure Sensor
6	Pressure Sensor
7	Left Side Plate
8	Brushless DC Motor
9	Oil Separator
10	Compressor And Fittings
11	Chassis Sub-Assy
12	Cabinet
13	Front Side Plate

NO.	Name of Part
14	Controller Holder
15	Front Grill
16	Electric Box Assy
17	Main Board
18	Terminal Board
19	Cut Off Valve
20	Electronic Expansion Valve
21	Plate-Type Heat Exchanger
22	Cut Off Valve
23	Strainer
24	Cut Off Valve
25	Strainer
26	Electronic Expansion Valve
27	Electric Expand Valve Fitting
28	Right Side Plate
29	4 Way Valve Coil
30	Electric Expand Valve Fitting
31	Drainage Hole Cap
32	Drainage Joint
33	Electrical Heater
34	Electrical Heater
35	Rear Grill

Above data is subject to change without notice, pls reference the SP in global service website.



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